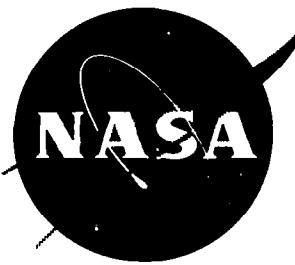


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# TECHNICAL NOTE

**D-12**

SOLUTIONS OF THE LAMINAR COMPRESSIBLE BOUNDARY-LAYER  
EQUATIONS WITH TRANSPERSION WHICH ARE  
APPLICABLE TO THE STAGNATION REGIONS  
OF AXISYMMETRIC BLUNT BODIES

By John T. Howe and William A. Mersman

Ames Research Center  
Moffett Field, Calif.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
WASHINGTON

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SUMMARY

Solutions of the laminar compressible boundary-layer equations in the Brown and Donoughe form are obtained for Euler number  $1/3$  and Prandtl number at the wall equal to 0.7. Fifteen solutions are presented for various wall-temperature levels and transpiration rates. The solutions are applicable to the stagnation region of axisymmetric bodies by means of the Mangler transformation.

INTRODUCTION

A detailed knowledge of velocity and temperature profiles in the stagnation region of blunt axisymmetric bodies having transpiration is of considerable interest. These profiles can be obtained from two-dimensional wedge flow solutions, in which the Euler number is  $1/3$ , by means of the Mangler transformation. Existing literature presents two-dimensional solutions for Euler numbers smaller and larger than this, but such that interpolation to obtain Euler number  $1/3$  solutions is considered to be inaccurate. In order to obtain accurate profiles for this Euler number, the equations of the two-dimensional laminar compressible boundary layer in the Brown, Donoughe, and Livingood form were integrated numerically. Solutions were obtained for five wall-temperature levels ( $T_e/T_w = 0.25, 0.5, 1, 2, \text{ and } 4$ ), each having three transpiration conditions ( $f_w = 0, -0.5, \text{ and } -1.0$ ).

The purpose of this report is to fill a gap in the existing literature. Therefore, only brief discussions of the theory and method are presented, and the complete numerical results are listed. Transformations to the desired axisymmetric coordinates are given so that local shear stress, heat transfer (as well as their corresponding dimensionless parameters), blowing rates, velocity profiles, and temperature profiles near the stagnation region of a blunt-nosed axisymmetric body can be obtained from the tabulated solutions.

## SYMBOLS

a	constant used in equation (18)
c	an arbitrary constant
$c_f$	local skin-friction coefficient, $\frac{2\tau_w}{\rho_e u_e^2}$
$c_p$	coefficient of specific heat at constant pressure
$E_u$	Euler number, $-x \frac{\partial p / \partial x}{\rho_e u_e^2}$
f	dimensionless stream function, $\frac{\rho_w \psi}{\sqrt{\mu_w x u_e \rho_w}}$
h	heat-transfer coefficient, $\frac{q_w}{T_w - T_e}$
k	thermal conductivity
L	an arbitrary reference length
Nu	Nusselt number, $\frac{hx}{k_w}$
P	temperature parameter, $\frac{T}{T_w} = 1 + \theta \frac{T_e - T_w}{T_w}$
Pr	Prandtl number, $\frac{c_p \mu}{k}$
q	heat-transfer rate, $-k \frac{\partial T}{\partial y}$
Re	Reynolds number, $\frac{\rho_w u_e x}{\mu_w}$
T	absolute temperature
u	velocity parallel to the wall
v	velocity normal to the wall
x	distance along wall surface from stagnation point
y	distance normal to wall surface

$\alpha$	exponent of temperature in specific-heat relationship
$\epsilon$	exponent of temperature in thermal conductivity relationship
$\eta$	independent variable in transformed boundary-layer equations, $y\sqrt{\rho_w u_e / \mu_w x}$
$\theta$	temperature variable, $\frac{T - T_w}{T_e - T_w}$
$\mu$	coefficient of viscosity
$\rho$	density
$\tau$	shear stress, $\mu \frac{\partial u}{\partial y}$
$\omega$	exponent of temperature in viscosity relationship
$\psi$	stream function defined by equation (9)

#### Subscripts

$e$	local conditions at the outer edge of the boundary layer
$w$	conditions at the wall

#### Superscripts

$-$	axisymmetric conditions
$', ''', ''''$	derivatives with respect to $\eta$

### THEORY

#### The Differential Equations

The two-dimensional partial differential equations describing the physical behavior of the laminar compressible boundary layer are:

$$\frac{\partial}{\partial x} (\rho u) + \frac{\partial}{\partial y} (\rho v) = 0 \quad (1)$$

$$\rho u \frac{\partial u}{\partial x} + \rho v \frac{\partial u}{\partial y} = \frac{\partial}{\partial y} \left( \mu \frac{\partial u}{\partial y} \right) - \frac{\partial p}{\partial x} \quad (2)$$

$$c_p \left( \rho u \frac{\partial T}{\partial x} + \rho v \frac{\partial T}{\partial y} \right) = \frac{\partial}{\partial y} \left( k \frac{\partial T}{\partial y} \right) + \mu \left( \frac{\partial u}{\partial y} \right)^2 + u \frac{\partial p}{\partial x} \quad (3)$$

These equations comprise statements of conservation of mass, the momentum theorem, and conservation of energy, respectively.

The boundary conditions are

at  $y = 0$ ,

$$u = 0, \quad v = v_w(x), \quad T = T_w \quad (4)$$

and at  $y \rightarrow \infty$ ,

$$T \rightarrow T_e, \quad u \rightarrow u_e \quad (5)$$

The partial differential equations (1), (2), and (3) can be transformed to ordinary differential equations having only one independent variable,  $\eta$ , by use of the following relationships introduced by Blasius (ref. 1, p. 135), von Kármán and Tsien (ref. 2), and Pohlhausen (ref. 1, p. 624), respectively.

$$\eta = y \sqrt{\frac{\rho_w u_e}{\mu_w x}} \quad (6)$$

$$\rho_w \psi = f \sqrt{\mu_w x u_e \rho_w} \quad (7)$$

and

$$\theta = \frac{T - T_w}{T_e - T_w} \quad (8)$$

The stream function,  $\psi$ , in equation (7) is defined so that the continuity equation (1) is automatically satisfied; that is,

$$\left. \begin{aligned} \rho u &= \frac{\partial(\rho_w \psi)}{\partial y} \\ \rho v &= - \frac{\partial(\rho_w \psi)}{\partial x} \end{aligned} \right\} \quad (9)$$

and

After certain assumptions and restrictions which will be presented in the next section have been imposed, the two-dimensional partial differential equations, transformed to ordinary differential equations in the manner of Brown, Donoughe, and Livingood (refs. 3, 4, and 5), become

$$\begin{aligned} f''' = \frac{1}{P^\omega} & \left[ Eu f'^2 - \left( \frac{Eu+1}{2} \right) ff'' - \frac{Eu}{P} \frac{T_w}{T_e} \right] - \\ & \frac{1}{P} \left( \frac{T_e}{T_w} - 1 \right) \left[ \left( \frac{Eu+1}{2} \right) \frac{ff' \theta'}{P^\omega} + f' \theta'' + (\omega+2) \theta' f'' + \left( \frac{T_e}{T_w} - 1 \right) \frac{\omega \theta'^2 f'}{P} \right] \end{aligned} \quad (10)$$

and

$$\theta'' = - \left[ \left( \frac{Eu+1}{2} \right) Pr_w f \theta' P^{(\alpha-\epsilon)} + \left( \frac{T_e}{T_w} - 1 \right) \frac{\epsilon \theta'^2}{P} \right] \quad (11)$$

The complete derivation of the equations can be found in reference 3.

The boundary conditions for equations (10) and (11) are as follows:

at  $\eta = 0$ ,

$$f' = 0 \quad (12)$$

$$f = f_w \text{ (required to be constant for similarity)} \quad (13)$$

$$\theta = 0 \quad (14)$$

at  $\eta \rightarrow \infty$

$$\theta \rightarrow 1 \quad (15)$$

$$f' \rightarrow \frac{T_w}{T_e} \quad (16)$$

Boundary condition (12) is easily derived by means of the first of boundary conditions (4), the relationship being shown by equation (23). Boundary condition (13) is similarly derived by means of the second of boundary conditions (4), the relationship being shown by equation (25). It is seen from equation (25) that  $f_w$  is a measure of the transpiration rate. Negative values of  $f_w$  correspond to blowing or transpiration. Boundary conditions (14) and (15) are obvious, and (16) is derived by means of the last of boundary conditions (5), the relationships being given by equations (23) and (15).

### Assumptions and Restrictions

The derivation of equations (10) and (11) included certain simplifying assumptions (ref. 3). These will be listed and then discussed in turn.

1. The local Mach number at the outer edge of the boundary layer is small.
2. The Euler number is constant.
3. The wall temperature is constant.
4. Local fluid properties within the boundary layer are proportional to some power of the absolute temperature.

The first assumption makes it possible to omit the dissipative terms (the last two terms in eq. (3)) in the energy equation (see p. 13, ref. 6) because these terms are proportional to Mach number squared. For this same reason,  $T_e$  and  $\rho_w$  are considered to be constant.

The second assumption permits integration of the Euler equation

$$-\frac{\partial p}{\partial x} = \rho_e u_e \frac{du_e}{dx} \quad (17)$$

resulting in

$$u_e = ax^{\epsilon} \quad (18)$$

Equation (18) and therefore the two-dimensional solutions reported here are of the wedge flow type (ref. 7, p. 128).

A combination of the first and third assumptions allows  $T_e/T_w$  to be treated as a constant in equations (10) and (11).

Although assumption number 4 states a proportional relationship of properties to some power of the absolute temperature, the constants of proportionality never have to be specified. The exponents, however, must be specified in order to integrate the differential equations. The power law relationships are simply

$$\frac{\mu}{\mu_w} = \left(\frac{T}{T_w}\right)^{\omega} \quad (19)$$

$$\frac{k}{k_w} = \left(\frac{T}{T_w}\right)^{\epsilon} \quad (20)$$

$$\frac{c_p}{c_{pw}} = \left( \frac{T}{T_w} \right)^\alpha \quad (21)$$

$$\frac{\rho}{\rho_w} = \left( \frac{T}{T_w} \right)^{-1} \quad (22)$$

The description of the two-dimensional theory is terminated at this point. A detailed discussion can be found in reference 3. Attention is now directed to a brief discussion of the method of solution, which differs somewhat from that of references 3 through 5.

#### Method of Solution and Specified Numerical Data

Solutions to equations (10) and (11) were obtained by numerical integration using the Adams-Moulton technique (ref. 8, p. 200, eqs. 6.6.2). This is a variable interval method which is especially well suited to this problem. The numerical solutions were computed on the IBM 704 electronic data processing machine.

The boundary conditions (12), (13), and (14) are not sufficient for starting the numerical integration of equations (10) and (11). Values of  $\theta'$  and  $f''$  are also needed at  $\eta = 0$  (i.e.,  $\theta_w'$  and  $f_w''$ ). These have to be estimated for the first attempt to integrate equations (10) and (11). As  $\eta \rightarrow \infty$ , the integration should yield the outer edge boundary conditions (15) and (16). Failure to produce and maintain these values indicates that the estimates for  $\theta_w'$  and  $f_w''$  were in error and new estimates must be made.

In order to facilitate selection of the correct  $\theta_w'$  and  $f_w''$ , three initial trial integrations of a given example were made as follows: the first trial used estimates of  $\theta_w'$  and  $f_w''$ . In the second integration, only  $\theta_w'$  was changed from the first estimate, and in the third integration only  $f_w''$  was changed from the first estimate. The results of these three trial runs yielded values for the partial derivatives of  $\theta$  and  $f'$  at  $\eta = \infty$  with respect to  $f_w''$  and  $\theta_w'$ . Linear interpolation then yielded revised estimates of the starting values,  $f_w''$  and  $\theta_w'$ . The process was then repeated until the correct initial values were obtained thus achieving the proper boundary conditions at  $\eta \rightarrow \infty$ .

Numerical data used for integrating equations (10) and (11) are

$$Pr_w = 0.70$$

$$\omega = 0.70$$

$$\epsilon = 0.85$$

$$\alpha = 0.19$$

These numbers are applicable to air in the temperature range 1060° R to 2860° R according to reference 3. All examples were computed for Euler number 1/3 for reasons which will be presented in the section "Physical Relationships for Axisymmetric Stagnation Regions." Examples were solved for five wall-temperature levels ( $T_e/T_w$  equal to 0.25, 0.5, 1, 2, and 4), each at three different transpiration conditions ( $f_w = 0$ , -0.5, and -1.0).

The numerical results of the integrations appear in tables I through XV. Velocity, temperature, and mass-flow profiles appear in figures 1 through 9. Heat-transfer and skin-friction parameter curves are shown in figures 10 and 11.

#### Physical Relationships for Two-Dimensional Wedge Flows

The following relationships are useful in obtaining values for the physical quantities of interest from the tabulated results. Note that the left-hand sides of both equations (23) and (24) are tabulated in tables I through XV.

$$\frac{u}{u_e} = f' \left[ 1 + \left( \frac{T_e}{T_w} - 1 \right) \theta \right] \quad (\text{ref. 4}) \quad (23)$$

$$\frac{\rho u}{\rho_e u_e} = f' \frac{T_e}{T_w} \quad (\text{ref. 4}) \quad (24)$$

$$(\rho v)_w = - \left( \frac{Eu + 1}{2} \right) f_w \sqrt{\frac{\rho_w \mu_w u_e}{x}} \quad (\text{ref. 3}) \quad (25)$$

$$\tau = \mu \frac{\partial u}{\partial y} = \mu_w u_e \sqrt{\frac{\rho_w u_e}{\mu_w x}} \left[ 1 + \left( \frac{T_e}{T_w} - 1 \right) \theta \right]^{\omega} \left\{ \left( \frac{T_e}{T_w} - 1 \right) f' \theta' + \left[ \left( \frac{T_e}{T_w} - 1 \right) \theta + 1 \right] f'' \right\} \quad (26)$$

$$\tau_w = u_e f_w'' \sqrt{\frac{\rho_w \mu_w u_e}{x}} \equiv \frac{c_f \rho_e u_e^2}{2} \quad (27)$$

$$c_f \frac{T_w}{T_e} \sqrt{Re} = 2 f_w'' \quad (\text{ref. 4}) \quad (28)$$

$$q_w = -k_w \left( \frac{\partial T}{\partial y} \right)_w = -k_w (T_e - T_w) \theta_w' \sqrt{\frac{\rho_w u_e}{\mu_w x}} \quad (29)$$

$$\frac{Nu}{\sqrt{Re}} = \theta_w' \quad (\text{ref. } 4) \quad (30)$$

It can be seen from equation (25) that because  $f_w$  is specified constant,  $v_w$  is required to vary as  $x^{(Eu-1)/2}$ .

These two-dimensional relationships (eqs. (23) through (30)) applied to the tabulated solutions for  $Eu = 1/3$  (tables I through XV) correspond to the two-dimensional flow over a wedge.

#### Physical Relationships for Axisymmetric Stagnation Regions

Relationships resulting from the Mangler transformation will now be presented (ref. 7, pp. 129 and 168) which make these wedge flow solutions applicable to the stagnation regions of blunt axisymmetric bodies. This transformation is a stretching of the  $x$  and  $y$  coordinates so that the pressure, enthalpy, density, viscosity, and velocity parallel to the surface at the point  $x, y$  in the wedge flow are the same as those at  $\bar{x}, \bar{y}$  in the axisymmetric flow. In the following equations, quantities which apply only to the axisymmetric flow are designated with a bar. Those which apply to the wedge flow (as well as those mentioned above which apply to either flow) are written without a bar. The relationships derived by the Mangler transformation are as follows:

$$\bar{x} = \left( \frac{3L^2 x}{c^2} \right)^{1/3} \quad (31)$$

$$\bar{y} = \frac{L}{cx} y \quad (32)$$

$$\bar{\eta} = \frac{1}{\sqrt{3}} \eta \quad (33)$$

$$\bar{Eu} = 3Eu \quad (34)$$

$$\bar{q}_w(\bar{x}) = \frac{c\bar{x}}{L} q_w(x) = -\sqrt{3} k_w(T_e - T_w) \theta_w' \sqrt{\frac{\rho_w u_e}{\mu_w \bar{x}}} \quad (35)$$

$$\bar{\tau}(\bar{x}, \bar{y}) = \frac{c\bar{x}}{L} \tau(x, y) = \sqrt{3} \mu_w u_e \sqrt{\frac{\rho_w u_e}{\mu_w \bar{x}}} \left[ 1 + \left( \frac{T_e}{T_w} - 1 \right) \theta \right]^\omega \left\{ \left( \frac{T_e}{T_w} - 1 \right) f' \theta' + \left[ \left( \frac{T_e}{T_w} - 1 \right) \theta + 1 \right] f'' \right\} \quad (36)$$

$$\bar{c}_f \frac{T_w}{T_e} \sqrt{\text{Re}} = \sqrt{3} c_f \frac{T_w}{T_e} \sqrt{\text{Re}} = 2\sqrt{3} f_w'' \quad (37)$$

$$\frac{\overline{\text{Nu}}}{\sqrt{\text{Re}}} = \sqrt{3} \frac{\text{Nu}}{\sqrt{\text{Re}}} = \sqrt{3} \theta_w' \quad (38)$$

$$(\rho \bar{v})_w = \frac{c \bar{x}}{L} (\rho v)_w = -\sqrt{3} \left( \frac{\bar{\text{Eu}} + 3}{6} \right) f_w \sqrt{\frac{\rho_w u_e \mu_w}{\bar{x}}} \quad (39)$$

$$\frac{\bar{v}_w}{u_e} \sqrt{\text{Re}} = - \frac{2 f_w}{\sqrt{3}} \quad (40)$$

Because the local Mach number exterior to the boundary layer is assumed to be small, the local exterior flow is considered to be almost incompressible. For the incompressible inviscid flow in the axisymmetric stagnation region, the velocity exterior to the boundary layer is a linear function of  $\bar{x}$  (ref. 7, p. 74, eq. (5.35)); that is, the axisymmetric Euler number ( $\bar{\text{Eu}}$ ) is unity in equations (34) and (39). This linear velocity for the axisymmetric stagnation region has also been observed experimentally over a wide range of free-stream Mach numbers. Equation (39) shows that the axisymmetric transpiration velocity,  $\bar{v}_w$ , is constant because  $u_e$  is proportional to  $\bar{x}$ .

The two-dimensional Euler number ( $\text{Eu}$ ) is  $1/3$  corresponding to  $\bar{\text{Eu}}$  of unity according to equation (34). All of the numerical solutions of equations (10) and (11) presented in this report are for  $\text{Eu}$  of  $1/3$  and can be used for the axisymmetric stagnation region. Application of equations (31) through (40) to the solutions in tables I through XV will yield the desired axisymmetric blunt body stagnation region values. Profiles of velocity, mass flow, and temperature for the axisymmetric stagnation region are shown in figures 1 through 9 by using the appropriate ordinate. Heat-transfer and skin-friction parameter curves are presented in figures 10 and 11.

## DISCUSSION

Some features of the solution and numerical results warrant mention.

The cases  $T_e/T_w = 1$  are somewhat special. The physical definition of  $\theta$  (eq. (8)) reveals that either  $\theta$  is infinite or indeterminate for these examples. However, the solutions for  $\theta$  turn out to be finite, as is shown in figures 7, 8, and 9, and listed in tables IV, V, and VI. Therefore  $\theta$ , as defined physically, is actually indeterminate, that is, the temperature,  $T$ , is constant and is equal to  $T_e$  (and  $T_w$ ) across the boundary layer. However,  $\theta$  is defined mathematically by the differential

equation (11) and the boundary conditions (14) and (15), but in this case it has no physical meaning. For this degenerate situation, the second set of brackets in equation (10) is dropped,  $P$  is unity, and the equation reduces to the familiar Falkner and Skan equation (ref. 1, p. 140) for constant property wedge flow conditions.

Examination of figures 1 through 3 and tables I through VI shows a velocity overshoot condition for hot wall cases; that is, the velocity within the boundary layer exceeds that at the outer edge of the boundary layer. This results from the greater acceleration of the less dense hot gas in the boundary layer by a given (favorable) pressure gradient. It is seen that the amount of overshoot increases with increasing wall temperature or blowing rate. References 4 and 5 show that the amount of overshoot increases with Euler number. The two-dimensional flow at  $\text{Eu} = 1/3$  passes through the same values of  $u/u_e$  as the axisymmetric flow at  $\text{Eu} = 1$ . Then it can be said that for a two-dimensional flow and an axisymmetric flow, both having Euler number unity, the magnitude of the velocity overshoot is smaller in the axisymmetric flow than it is in the two-dimensional flow.

It is interesting to note in figures 4 through 6 and tables X through XV that an overshoot in mass flow occurs. Because of the increased density near a cold wall, this mass-flow overshoot is increased as the wall-temperature level is decreased, in contrast with the behavior of the velocity overshoot condition. However, the amount of mass-flow overshoot increases with blowing rate as was the case with the velocity overshoot condition.

Figure 10 shows that for a given wall-temperature level, transpiration reduces the heat transferred to the wall to a remarkable extent. In particular, for  $T_e/T_w$  equal to 4, the heat-transfer parameter corresponding to transpiration parameter 0.667 is only about one fifth of its value for no transpiration. It is seen that the effectiveness of transpiration in reducing the heat-transfer parameter increases with the transpiration rate and with  $T_e/T_w$ .

As would be expected, figure 11 shows a similar effect of transpiration on skin friction. Quantitatively, for  $T_e/T_w$  equal to 4, the skin-friction parameter corresponding to transpiration parameter 0.667 is only about one third of its value for no transpiration.

#### SUMMARY OF RESULTS

The Brown, Donoughe, and Livingood forms of the laminar compressible boundary-layer equations have been integrated numerically on the IBM 704 electronic data processing machine. Fifteen solutions were obtained for Euler number 1/3, wall Prandtl number 0.7, and for five ratios of local free-stream temperature to wall temperature each at three different

transpiration conditions. These are  $T_e/T_w$  values of 0.25, 0.5, 1, 2, and 4, and transpiration rates corresponding to  $f_w$  of 0, -0.5, and -1.0. The solutions are presented in the forms of tables and graphs.

Relationships are presented by which the tabulated solutions can be applied to stagnation regions of axisymmetric blunt bodies.

The results indicate velocities in the boundary layer greater than the local exterior velocity for hot wall flow situations. The results also indicate local mass flows greater in the boundary layer than exterior to it for cold wall situations. These "overshoot" conditions are accentuated by increased transpiration for both the velocity profiles and the mass-flow profiles.

A large reduction of skin friction and heat transfer is achieved by transpiration. The reduction is greater for situations in which the walls are colder than the local exterior flow.

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National Aeronautics and Space Administration  
Moffett Field, Calif., Mar. 20, 1959

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TABLE I.-  $T_e/T_w = 0.25$ ,  $f_w = 0$ ,  $Eu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
.000	.00000	.000000	1.556297	.045950	.000000	.437659	.122110	.00000	.00000
.005	.00002	.007782	1.556529	.046752	.002190	.438271	.122649	.00777	.00195
.010	.00008	.015565	1.556765	.047564	.004383	.438885	.123185	.01551	.00389
.015	.00018	.023350	1.557004	.048387	.006579	.439503	.123716	.02323	.00584
.020	.00031	.031135	1.557248	.049220	.008778	.440123	.124243	.03093	.00778
.025	.00049	.038922	1.557497	.050063	.010980	.440745	.124766	.03860	.00973
.030	.00070	.046710	1.557749	.050917	.013185	.441370	.125285	.04625	.01168
.040	.00125	.062290	1.558267	.052656	.017605	.442628	.126311	.06147	.01557
.050	.00195	.077876	1.558802	.054438	.022038	.443896	.127319	.07659	.01947
.060	.00280	.093466	1.559356	.056264	.026483	.445175	.128310	.09161	.02337
.070	.00382	.109063	1.559928	.058133	.030941	.446463	.129284	.10653	.02727
.080	.00498	.124665	1.560519	.060048	.035412	.447760	.130239	.12135	.03117
.090	.00631	.140273	1.561129	.062009	.039897	.449067	.131176	.13608	.03507
.110	.00943	.171509	1.562409	.066070	.048904	.451709	.132992	.16522	.04288
.130	.01317	.202770	1.563773	.070324	.057965	.454386	.134729	.19396	.05069
.150	.01754	.234060	1.565224	.074776	.067080	.457098	.136384	.22228	.05852
.170	.02253	.265380	1.566765	.079433	.076249	.459841	.137952	.25020	.06634
.190	.02815	.296731	1.568402	.084302	.085474	.462615	.139429	.27771	.07418
.210	.03440	.328117	1.570139	.089391	.094754	.465418	.140811	.30480	.08203
.250	.04878	.390996	1.573929	.100258	.113484	.471101	.143273	.35772	.09775
.290	.06568	.454037	1.578173	.112098	.132443	.476874	.145299	.40894	.11351
.330	.08511	.517257	1.582911	.124980	.151635	.482718	.146848	.45843	.12931
.370	.10707	.580677	1.588186	.138979	.171062	.488615	.147871	.50618	.14517
.410	.13157	.644319	1.594045	.154172	.190725	.494540	.148319	.55215	.16108
.450	.15862	.708209	1.600537	.170645	.210625	.500472	.148135	.59633	.17705
.530	.22041	.836836	1.615635	.207783	.251135	.512242	.145624	.67922	.20921
.610	.29254	.966796	1.633948	.251126	.292575	.523683	.139785	.75465	.24170
.690	.37514	1.098368	1.656000	.301398	.334907	.534502	.129966	.82248	.27459
.770	.46834	1.231872	1.682373	.359209	.378069	.544351	.115407	.88257	.30797
.850	.57230	1.367679	1.713683	.424851	.421967	.552817	.095238	.93484	.34192
.930	.68724	1.506210	1.750547	.497938	.466470	.559413	.068482	.97926	.37655
.930	.68724	1.506210	1.750547	.497938	.466470	.559413	.068482	.97926	.37655
.970	.74889	1.576641	1.771238	.536832	.488897	.561836	.052303	.99853	.39416
1.010	.81338	1.647930	1.793509	.576824	.511408	.563570	.034073	1.01586	.41198
1.050	.88074	1.720143	1.817392	.617353	.533973	.564532	.013655	1.03126	.43004
1.090	.95100	1.793343	1.842894	.657637	.556559	.564632	-.009085	1.04477	.44834

TABLE I.-  $T_e/T_w = 0.25$ ,  $f_w = 0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
1.130	1.02422	1.867596	1.869985	.696608	.579130	.563773	-.034272	1.05641	.46690
1.170	1.10043	1.942962	1.898585	.732851	.601647	.561856	-.062016	1.06623	.48574
1.210	1.17967	2.019501	1.928551	.764523	.624063	.558776	-.092402	1.07428	.50488
1.250	1.26200	2.097261	1.959654	.789272	.646332	.554428	-.125479	1.08062	.52432
1.290	1.34747	2.176284	1.991561	.804163	.668399	.548702	-.161250	1.08531	.54407
1.330	1.43612	2.256591	2.023807	.805601	.690208	.541493	-.199653	1.08845	.56415
1.370	1.52801	2.338185	2.055771	.789298	.711697	.532697	-.240540	1.09012	.58455
1.410	1.62319	2.421038	2.086646	.750282	.732801	.522220	-.283661	1.09043	.60526
1.450	1.72171	2.505088	2.115415	.682995	.753451	.509979	-.328637	1.08949	.62627
1.490	1.82362	2.590226	2.140829	.581502	.773575	.495912	-.374937	1.08742	.64756
1.530	1.92894	2.676290	2.161400	.439870	.793099	.479976	-.421861	1.08437	.66907
1.570	2.03773	2.763050	2.175412	.252734	.811948	.462166	-.468522	1.08046	.69076
1.610	2.14999	2.850209	2.180959	.016070	.830048	.442513	-.513846	1.07585	.71255
1.610	2.14999	2.850209	2.180959	.016070	.830048	.442513	-.513846	1.07585	.71255
1.630	2.20743	2.893822	2.179926	-.121494	.838794	.432017	-.535622	1.07333	.72346
1.650	2.26575	2.937387	2.176014	-.271852	.847326	.421093	-.556583	1.07069	.73435
1.670	2.32493	2.980842	2.168969	-.434691	.855635	.409760	-.576553	1.06796	.74521
1.690	2.38498	3.024123	2.158547	-.609425	.863714	.398039	-.595349	1.06514	.75603
1.710	2.44589	3.067160	2.144519	-.795171	.871554	.385955	-.612786	1.06226	.76679
1.730	2.50766	3.109878	2.126675	-.990731	.879150	.373538	-.628680	1.05934	.77747
1.750	2.57028	3.152200	2.104835	-.1.194578	.886494	.360820	-.642852	1.05640	.78805
1.770	2.63375	3.194044	2.078850	-.1.404864	.893581	.347837	-.655130	1.05344	.79851
1.790	2.69804	3.235326	2.048612	-.1.619426	.900406	.334628	-.665353	1.05050	.80883
1.810	2.76316	3.275960	2.014061	-.1.835821	.906965	.321237	-.673378	1.04757	.81899
1.830	2.82908	3.315859	1.975185	-.2.051364	.913254	.307709	-.679079	1.04469	.82896
1.850	2.89578	3.354939	1.932031	-.2.263190	.919272	.294090	-.682357	1.04186	.83873
1.870	2.96327	3.393113	1.884702	-.2.468319	.925018	.280431	-.683138	1.03910	.84828
1.890	3.03150	3.430300	1.833363	-.2.663742	.930490	.266781	-.681379	1.03641	.85758
1.910	3.10047	3.466422	1.778237	-.2.846507	.935689	.253193	-.677069	1.03380	.86661
1.930	3.17015	3.501406	1.719606	-.3.013811	.940618	.239715	-.670230	1.03129	.87535
1.950	3.24052	3.535185	1.657805	-.3.163094	.945279	.226400	-.660920	1.02888	.88380
1.970	3.31155	3.567700	1.593217	-.3.292121	.949676	.213295	-.649229	1.02658	.89192
1.990	3.38322	3.598898	1.526267	-.3.399053	.953812	.200446	-.635280	1.02439	.89972
2.010	3.45550	3.628738	1.457411	-.3.482513	.957695	.187897	-.619227	1.02232	.90718
2.030	3.52836	3.657185	1.387128	-.3.541615	.961331	.175690	-.601248	1.02036	.91430
2.050	3.60178	3.684217	1.315910	-.3.575993	.964725	.163859	-.581543	1.01852	.92105

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TABLE I.-  $T_e/T_w = 0.25$ ,  $f_w = 0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
2.070	3.67572	3.709819	1.244251	-3.585794	.967888	.152438	-.560333	1.01680	.92745
2.090	3.75016	3.733987	1.172637	-3.571661	.970826	.141454	-.537849	1.01520	.93350
2.110	3.82507	3.756728	1.101537	-3.534685	.973549	.130931	-.514329	1.01371	.93918
2.130	3.90042	3.778055	1.031392	-3.476357	.976066	.120886	-.490014	1.01233	.94451
2.150	3.97618	3.797993	.962612	-3.398501	.978388	.111334	-.465143	1.01106	.94950
2.170	4.05233	3.816571	.895568	-3.303196	.980523	.102283	-.439948	1.00989	.95414
2.190	4.12884	3.833829	.830585	-3.192701	.982482	.093737	-.414649	1.00883	.95846
2.210	4.20567	3.849810	.767945	-3.069381	.984276	.085696	-.389451	1.00785	.96245
2.230	4.28282	3.864564	.707879	-2.935635	.985914	.078157	-.364543	1.00697	.96614
2.250	4.36025	3.878144	.650573	-2.793829	.987405	.071111	-.340096	1.00617	.96954
2.270	4.43794	3.890606	.596165	-2.646244	.988761	.064549	-.316258	1.00545	.97265
2.290	4.51587	3.902010	.544748	-2.495025	.989990	.058456	-.293158	1.00480	.97550
2.310	4.59401	3.912416	.496375	-2.342152	.991102	.052817	-.270903	1.00421	.97810
2.330	4.67236	3.921886	.451061	-2.189412	.992106	.047614	-.249579	1.00369	.98047
2.350	4.75088	3.930479	.408787	-2.038380	.993010	.042827	-.229255	1.00323	.98262
2.370	4.82957	3.938257	.369506	-1.890419	.993822	.038437	-.209977	1.00281	.98456
2.390	4.90841	3.945279	.333143	-1.746677	.994550	.034421	-.191779	1.00245	.98632
2.410	4.98738	3.951602	.299605	-1.608091	.995201	.030758	-.174674	1.00212	.98790
2.430	5.06647	3.957281	.268780	-1.475406	.995782	.027427	-.158667	1.00184	.98932
2.450	5.14566	3.962370	.240546	-1.349178	.996300	.024404	-.143746	1.00159	.99059
2.470	5.22496	3.966919	.214768	-1.229802	.996760	.021670	-.129892	1.00137	.99173
2.490	5.30434	3.970976	.191307	-1.117524	.997169	.019202	-.117076	1.00118	.99274
2.510	5.38379	3.974586	.170019	-1.012459	.997530	.016980	-.105263	1.00101	.99365
2.530	5.46332	3.977790	.150760	-.914613	.997849	.014985	-.094411	1.00086	.99445
2.550	5.54290	3.980629	.133387	-.823898	.998131	.013197	-.084475	1.00074	.99516
2.570	5.62254	3.983137	.117758	-.740152	.998379	.011600	-.075406	1.00063	.99578
2.590	5.70223	3.985350	.103736	-.663145	.998596	.010176	-.067155	1.00053	.99634
2.610	5.78195	3.987297	.091189	-.592606	.998787	.008909	-.059669	1.00045	.99682
2.630	5.86172	3.989006	.079991	-.528224	.998953	.007784	-.052899	1.00038	.99725
2.650	5.94151	3.990505	.070021	-.469666	.999099	.006788	-.046792	1.00032	.99763
2.670	6.02134	3.991815	.061168	-.416580	.999226	.005908	-.041299	1.00027	.99795
2.690	6.10118	3.992958	.053324	-.368609	.999336	.005133	-.036371	1.00023	.99824
2.710	6.18105	3.993954	.046392	-.325393	.999432	.004450	-.031962	1.00019	.99849
2.730	6.26094	3.994819	.040279	-.286576	.999514	.003851	-.028027	1.00016	.99870
2.770	6.42076	3.996220	.030182	-.220767	.999648	.002867	-.021415	1.00011	.99905
2.810	6.58063	3.997265	.022438	-.168555	.999747	.002119	-.016227	1.00007	.99932

TABLE I.-  $T_e/T_w = 0.25$ ,  $f_w = 0$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
2.850	6.74054	3.998039	.016549	-.127566	.999820	.001554	-.012194	1.00005	.99951
2.890	6.90047	3.998608	.012110	-.095708	.999873	.001131	-.009088	1.00003	.99965
2.930	7.06043	3.999023	.008793	-.071195	.999912	.000817	-.006718	1.00002	.99976
2.970	7.22039	3.999323	.006336	-.052513	.999940	.000586	-.004926	1.00001	.99983
3.010	7.38037	3.999539	.004530	-.038409	.999960	.000417	-.003583	1.00001	.99988
3.050	7.54036	3.999693	.003214	-.027860	.999974	.000294	-.002585	1.00000	.99992
3.090	7.70035	3.999801	.002264	-.020041	.999984	.000206	-.001851	1.00000	.99995
3.130	7.86034	3.999877	.001582	-.014298	.999991	.000144	-.001314	1.00000	.99997
3.170	8.02034	3.999931	.001098	-.010117	.999995	.000099	-.000926	1.00000	.99998
3.210	8.18033	3.999967	.000757	-.007100	.999999	.000068	-.000647	1.00000	.99999
3.250	8.34033	3.999993	.000518	-.004942	1.000001	.000046	-.000449	1.00000	1.00000
3.290	8.50033	4.000010	.000352	-.003413	1.000002	.000031	-.000309	1.00000	1.00000
3.330	8.66033	4.000021	.000238	-.002338	1.000003	.000021	-.000211	1.00000	1.00001
3.370	8.82034	4.000029	.000161	-.001588	1.000004	.000014	-.000143	.99999	1.00001
3.410	8.98034	4.000035	.000108	-.001070	1.000005	.000009	-.000096	.99999	1.00001
3.450	9.14034	4.000038	.000073	-.000715	1.000005	.000006	-.000064	.99999	1.00001
3.490	9.30034	4.000041	.000049	-.000474	1.000005	.000004	-.000042	.99999	1.00001
3.530	9.46034	4.000042	.000034	-.000312	1.000005	.000003	-.000028	.99999	1.00001
3.570	9.62034	4.000043	.000023	-.000203	1.000005	.000002	-.000018	1.00000	1.00001
3.610	9.78034	4.000044	.000017	-.000132	1.000005	.000001	-.000012	1.00000	1.00001
3.650	9.94035	4.000045	.000012	-.000085	1.000005	.000001	-.000007	1.00000	1.00001
3.690	10.10035	4.000045	.000010	-.000053	1.000005	.000000	-.000005	1.00000	1.00001
3.730	10.26035	4.000046	.000008	-.000034	1.000005	.000000	-.000003	1.00000	1.00001
3.810	10.58035	4.000046	.000006	-.000013	1.000005	.000000	-.000001	1.00000	1.00001
3.890	10.90036	4.000047	.000006	-.000005	1.000005	.000000	-.000000	1.00000	1.00001

TABLE II.-  $T_e/T_w = 0.25$ ,  $f_w = -0.5$ ,  $E_u = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
.000	-.50000	.000000	1.369742	-.004999	.000000	.314289	.136305	.00000	.00000
.005	-.49998	.006849	1.369719	-.004501	.001573	.314972	.136868	.00684	.00171
.010	-.49993	.013697	1.369697	-.003998	.003150	.315658	.137429	.01366	.00342
.015	-.49985	.020546	1.369679	-.003489	.004730	.316347	.137990	.02047	.00514
.020	-.49973	.027394	1.369663	-.002974	.006313	.317038	.138549	.02726	.00685
.025	-.49957	.034242	1.369649	-.002452	.007900	.317732	.139107	.03404	.00856
.030	-.49938	.041090	1.369638	-.001925	.009491	.318429	.139663	.04080	.01027
.040	-.49890	.054787	1.369624	-.000852	.012682	.319831	.140772	.05427	.01370
.050	-.49829	.068483	1.369621	.000246	.015887	.321245	.141876	.06767	.01712
.060	-.49753	.082179	1.369629	.001369	.019107	.322669	.142974	.08100	.02054
.070	-.49664	.095876	1.369649	.002518	.022341	.324104	.144065	.09427	.02397
.080	-.49562	.109572	1.369680	.003694	.025589	.325550	.145151	.10747	.02739
.090	-.49445	.123269	1.369723	.004895	.028852	.327007	.146230	.12060	.03082
.110	-.49171	.150665	1.369845	.007380	.035421	.329953	.148369	.14666	.03767
.130	-.48843	.178063	1.370019	.009976	.042050	.332942	.150478	.17245	.04452
.150	-.48459	.205466	1.370245	.012687	.048739	.335972	.152557	.19796	.05137
.170	-.48021	.232874	1.370527	.015517	.055489	.339044	.154604	.22318	.05822
.190	-.47528	.260287	1.370866	.018470	.062301	.342156	.156614	.24813	.06507
.210	-.46980	.287709	1.371266	.021549	.069176	.345308	.158587	.27278	.07193
.250	-.45719	.342578	1.372258	.028108	.083116	.351728	.162410	.32122	.08564
.290	-.44239	.397493	1.373523	.035231	.097316	.358298	.166049	.36848	.09937
.330	-.42539	.452464	1.375084	.042957	.111782	.365010	.169479	.41453	.11312
.370	-.40619	.507504	1.376968	.051333	.126519	.371853	.172673	.45935	.12688
.410	-.38479	.562626	1.379200	.060406	.141532	.378820	.175601	.50290	.14066
.450	-.36118	.617845	1.381810	.070228	.156826	.385898	.178232	.54517	.15446
.530	-.30732	.728637	1.388291	.092355	.188273	.400335	.182453	.62575	.18216
.610	-.24458	.840023	1.396687	.118229	.220887	.415046	.185011	.70086	.21001
.690	-.17290	.952167	1.407323	.148447	.254683	.429882	.185520	.77029	.23804
.770	-.09221	1.065264	1.420573	.183688	.289666	.444662	.183526	.83384	.26632
.850	-.00243	1.179540	1.436868	.224701	.325822	.459165	.178497	.89130	.29488
.930	.09656	1.295257	1.456700	.272266	.363118	.473124	.169815	.94251	.32381
1.010	.20486	1.412721	1.480625	.327120	.401499	.486219	.156763	.98732	.35318
1.090	.32265	1.532283	1.509248	.389802	.440880	.498068	.138526	1.02562	.38307
1.170	.45009	1.654344	1.543204	.460385	.481144	.508220	.114185	1.05736	.41359
1.210	.51751	1.716450	1.562374	.498427	.501561	.512498	.099416	1.07077	.42911
1.250	.58742	1.779354	1.583099	.538014	.522136	.516148	.082741	1.08256	.44484

TABLE II.-  $T_e/T_w = 0.25$ ,  $f_w = -0.5$ ,  $\epsilon_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
1.290	.65987	1.843120	1.605431	.578770	.542843	.519090	.064028	1.09273	.46078
1.330	.73488	1.907811	1.629408	.620147	.563652	.521241	.043148	1.10130	.47695
1.370	.81250	1.973494	1.655041	.661372	.584531	.522512	.019977	1.10832	.49337
1.410	.89278	2.040236	1.682302	.701396	.605440	.522808	-.005598	1.11381	.51006
1.450	.97574	2.108099	1.711117	.738823	.626341	.522031	-.033672	1.11781	.52702
1.490	1.06144	2.177144	1.741348	.771844	.647187	.520080	-.064314	1.12038	.54429
1.530	1.14993	2.247423	1.772775	.798153	.667930	.516851	-.097555	1.12158	.56186
1.570	1.24125	2.318978	1.805072	.814884	.688517	.512241	-.133376	1.12149	.57974
1.610	1.33546	2.391835	1.837790	.818544	.708890	.506148	-.171692	1.12017	.59796
1.650	1.43261	2.465999	1.870325	.804992	.728987	.498475	-.212333	1.11774	.61650
1.690	1.53276	2.541448	1.901895	.769462	.748745	.489134	-.255026	1.11427	.63536
1.730	1.63595	2.618124	1.931517	.706668	.768095	.478051	-.299373	1.10990	.65453
1.770	1.74222	2.695927	1.957990	.611037	.786965	.465169	-.344829	1.10473	.67398
1.810	1.85163	2.774702	1.979889	.477076	.805284	.450459	-.390689	1.09888	.69368
1.850	1.96421	2.854235	1.995581	.299927	.822978	.433921	-.436074	1.09251	.71356
1.890	2.07998	2.934241	2.003262	.076104	.839974	.415594	-.479938	1.08573	.73356
1.910	2.13906	2.974313	2.003505	-.053810	.848188	.405784	-.500929	1.08223	.74358
1.930	2.19895	3.014363	2.001030	-.195630	.856202	.395562	-.521079	1.07868	.75359
1.950	2.25964	3.054335	1.995603	-.349004	.864008	.384947	-.540222	1.07511	.76358
1.970	2.32112	3.094166	1.986997	-.513326	.871598	.373961	-.558185	1.07151	.77354
1.990	2.38340	3.133792	1.975003	-.687718	.878964	.362629	-.574799	1.06792	.78345
2.010	2.44647	3.173142	1.959430	-.871010	.886101	.350979	-.589892	1.06435	.79329
2.030	2.51033	3.212144	1.940113	-.1061738	.893002	.339045	-.603301	1.06081	.80304
2.050	2.57496	3.250721	1.916923	-.1258148	.899661	.326860	-.614871	1.05731	.81268
2.070	2.64035	3.288795	1.889763	-.1458209	.906075	.314463	-.624458	1.05387	.82220
2.090	2.70650	3.326285	1.858585	-.1659649	.912238	.301895	-.631935	1.05051	.83157
2.110	2.77340	3.363111	1.823385	-.1859987	.918150	.289200	-.637195	1.04723	.84078
2.130	2.84102	3.399194	1.784211	-.2056594	.923806	.276423	-.640152	1.04405	.84980
2.150	2.90936	3.434454	1.741164	-.2246758	.929206	.263610	-.640749	1.04097	.85861
2.170	2.97840	3.468816	1.694402	-.2427751	.934350	.250809	-.638954	1.03800	.86720
2.190	3.04811	3.502207	1.644133	-.2596915	.939239	.238068	-.634767	1.03515	.87555
2.210	3.11848	3.534559	1.590621	-.2751741	.943874	.225434	-.628217	1.03243	.88364
2.230	3.18948	3.565812	1.534174	-.2889946	.948257	.212954	-.619367	1.02983	.89145
2.250	3.26110	3.595909	1.475147	-.3009551	.952393	.200674	-.608307	1.02737	.89898
2.270	3.33331	3.624803	1.413927	-.3108935	.956286	.188636	-.595157	1.02504	.90620
2.290	3.40609	3.652454	1.350931	-.3186894	.959941	.176881	-.580065	1.02285	.91311

TABLE II.-  $T_e/T_w = 0.25$ ,  $f_w = -0.5$ ,  $\epsilon_{ue} = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
2.310	3.47940	3.678832	1.286598	-3.242664	.963363	.165445	-.563200	1.02079	.91971
2.330	3.55323	3.703912	1.221374	-3.275941	.966561	.154363	-.544751	1.01887	.92598
2.350	3.62755	3.727684	1.155709	-3.286877	.969540	.143664	-.524921	1.01708	.93192
2.370	3.70233	3.750141	1.090044	-3.276059	.972310	.133374	-.503925	1.01542	.93754
2.390	3.77755	3.771288	1.024804	-3.244471	.974878	.123514	-.481984	1.01388	.94282
2.410	3.85317	3.791139	.960394	-3.193449	.977254	.114099	-.459319	1.01246	.94778
2.430	3.92918	3.809712	.897185	-3.124620	.979445	.105144	-.436149	1.01116	.95243
2.450	4.00555	3.827036	.835515	-3.039839	.981462	.096655	-.412686	1.00997	.95676
2.470	4.08226	3.843145	.775684	-2.941120	.983315	.088637	-.389130	1.00888	.96079
2.490	4.15927	3.858078	.717949	-2.830575	.985011	.081090	-.365671	1.00789	.96452
2.510	4.23657	3.871878	.662525	-2.710344	.986561	.074009	-.342480	1.00699	.96797
2.530	4.31414	3.884595	.609586	-2.582547	.987974	.067388	-.319712	1.00618	.97115
2.550	4.39195	3.896279	.559260	-2.449230	.989260	.061217	-.297505	1.00545	.97407
2.570	4.46998	3.906983	.511640	-2.312325	.990426	.055483	-.275975	1.00480	.97675
2.590	4.54822	3.916763	.466779	-2.173621	.991482	.050172	-.255222	1.00421	.97919
2.610	4.62665	3.925673	.424697	-2.034740	.992436	.045268	-.235325	1.00369	.98142
2.630	4.70524	3.933769	.385382	-1.897120	.993295	.040753	-.216345	1.00322	.98344
2.650	4.78399	3.941107	.348796	-1.762012	.994068	.036608	-.198330	1.00281	.98528
2.670	4.86288	3.947739	.314878	-1.630478	.994762	.032813	-.181308	1.00244	.98693
2.690	4.94190	3.953719	.283547	-1.503397	.995383	.029349	-.165294	1.00212	.98843
2.710	5.02103	3.959097	.254708	-1.381467	.995938	.026195	-.150293	1.00184	.98977
2.730	5.10026	3.963923	.228251	-1.265230	.996433	.023331	-.136296	1.00159	.99098
2.750	5.17958	3.968242	.204058	-1.155072	.996873	.020737	-.123286	1.00137	.99206
2.770	5.25899	3.972100	.182006	-1.051247	.997264	.018393	-.111237	1.00118	.99302
2.790	5.33846	3.975536	.161965	-.953893	.997610	.016281	-.100118	1.00101	.99388
2.810	5.41800	3.978591	.143807	-.863043	.997917	.014382	-.089892	1.00086	.99465
2.830	5.49760	3.981300	.127401	-.778644	.998187	.012680	-.080518	1.00074	.99532
2.850	5.57725	3.983698	.112619	-.700571	.998425	.011156	-.071953	1.00063	.99592
2.870	5.65695	3.985815	.099337	-.628641	.998634	.009796	-.064150	1.00054	.99645
2.890	5.73668	3.987680	.087434	-.562623	.998818	.008585	-.057062	1.00046	.99692
2.910	5.81646	3.989321	.076795	-.502251	.998978	.007509	-.050644	1.00039	.99733
2.930	5.89626	3.990760	.067309	-.447237	.999119	.006556	-.044847	1.00033	.99769
2.950	5.97608	3.992020	.058872	-.397271	.999241	.005712	-.039627	1.00028	.99800
2.970	6.05594	3.993121	.051386	-.352036	.999348	.004967	-.034938	1.00023	.99828
2.990	6.13581	3.994081	.044761	-.311213	.999441	.004311	-.030737	1.00020	.99852
3.010	6.21570	3.994917	.038910	-.274479	.999521	.003734	-.026984	1.00016	.99873

TABLE II.-  $T_e/T_w = 0.25$ ,  $f_w = -0.5$ ,  $\epsilon_u = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
3.050	6.37552	3.996271	.029227	-.212044	.999651	.002786	-.020665	1.00011	.99907
3.090	6.53540	3.997284	.021778	-.162340	.999747	.002063	-.015693	1.00008	.99932
3.130	6.69530	3.998037	.016100	-.123194	.999818	.001517	-.011820	1.00005	.99951
3.170	6.85524	3.998591	.011808	-.092674	.999870	.001106	-.008829	1.00004	.99965
3.210	7.01519	3.998996	.008592	-.069118	.999908	.000801	-.006541	1.00003	.99975
3.250	7.17515	3.999289	.006203	-.051111	.999935	.000575	-.004807	1.00002	.99982
3.290	7.33513	3.999501	.004443	-.037478	.999955	.000410	-.003504	1.00001	.99988
3.330	7.49511	3.999651	.003158	-.027252	.999969	.000290	-.002534	1.00001	.99991
3.370	7.65510	3.999758	.002227	-.019652	.999978	.000204	-.001818	1.00000	.99994
3.410	7.81509	3.999833	.001558	-.014055	.999985	.000142	-.001294	1.00000	.99996
3.450	7.97509	3.999885	.001082	-.009969	.999990	.000098	-.000914	1.00000	.99997
3.490	8.13508	3.999922	.000745	-.007013	.999993	.000068	-.000640	1.00000	.99998
3.530	8.29508	3.999947	.000509	-.004893	.999996	.000046	-.000445	1.00000	.99999
3.570	8.45508	3.999963	.000345	-.003387	.999997	.000031	-.000307	1.00000	.99999
3.610	8.61508	3.999975	.000232	-.002325	.999998	.000021	-.000210	1.00000	.99999
3.650	8.77508	3.999982	.000154	-.001583	.999999	.000014	-.000142	1.00000	1.00000
3.690	8.93508	3.999987	.000102	-.001069	.999999	.000009	-.000096	1.00000	1.00000
3.730	9.09508	3.999991	.000066	-.000716	1.000000	.000006	-.000064	1.00000	1.00000
3.770	9.25508	3.999993	.000043	-.000476	1.000000	.000004	-.000042	1.00000	1.00000
3.810	9.41508	3.999994	.000027	-.000314	1.000000	.000003	-.000028	1.00000	1.00000
3.850	9.57508	3.999995	.000017	-.000205	1.000000	.000002	-.000018	1.00000	1.00000
3.890	9.73508	3.999996	.000010	-.000133	1.000000	.000001	-.000012	1.00000	1.00000
3.930	9.89508	3.999996	.000006	-.000086	1.000000	.000001	-.000008	1.00000	1.00000
3.970	10.05508	3.999996	.000003	-.000055	1.000000	.000000	-.000005	1.00000	1.00000
4.050	10.37507	3.999996	.000000	-.000022	1.000000	.000000	-.000002	1.00000	1.00000
4.130	10.69507	3.999996	-.000001	-.000008	1.000000	.000000	-.000001	1.00000	1.00000

TABLE III.-  $T_e/T_w = 0.25$ ,  $f_w = -1.0$ ,  $\text{Eu} = 1/3$ 

N

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
.000	-1.00000	.000000	1.194912	-.024859	.000000	.211541	.127247	.000000	.000000
.005	-.99999	.005974	1.194788	-.024571	.001059	.212179	.127790	.00597	.00149
.010	-.99994	.011948	1.194666	-.024279	.002122	.212819	.128334	.01193	.00299
.015	-.99987	.017921	1.194545	-.023984	.003187	.213462	.128878	.01788	.00448
.020	-.99976	.023893	1.194426	-.023686	.004256	.214108	.129422	.02382	.00597
.025	-.99963	.029865	1.194309	-.023384	.005329	.214757	.129967	.02975	.00747
.030	-.99946	.035836	1.194192	-.023079	.006404	.215408	.130512	.03566	.00896
.040	-.99904	.047777	1.193965	-.022458	.008565	.216718	.131604	.04747	.01194
.050	-.99851	.059716	1.193743	-.021824	.010738	.218040	.132697	.05923	.01493
.060	-.99785	.071652	1.193528	-.021175	.012925	.219372	.133792	.07096	.01791
.070	-.99707	.083586	1.193320	-.020511	.015126	.220716	.134888	.08264	.02090
.080	-.99618	.095519	1.193118	-.019833	.017340	.222070	.135985	.09428	.02388
.090	-.99516	.107449	1.192923	-.019140	.019567	.223435	.137083	.10587	.02686
.110	-.99278	.131303	1.192555	-.017709	.024064	.226199	.139282	.12893	.03283
.130	-.98991	.155151	1.192215	-.016215	.028616	.229007	.141484	.15182	.03879
.150	-.98657	.178992	1.191906	-.014657	.033224	.231858	.143687	.17453	.04475
.170	-.98275	.202828	1.191629	-.013032	.037890	.234754	.145890	.19706	.05071
.190	-.97846	.226658	1.191386	-.011339	.042615	.237694	.148093	.21941	.05666
.210	-.97369	.250483	1.191176	-.009575	.047398	.240678	.150294	.24158	.06262
.250	-.96271	.298124	1.190867	-.005825	.057147	.246778	.154683	.28535	.07453
.290	-.94984	.345755	1.190715	-.001763	.067143	.253052	.159045	.32834	.08644
.330	-.93505	.393383	1.190731	.002632	.077393	.259501	.163369	.37055	.09835
.370	-.91836	.441016	1.190930	.007386	.087905	.266121	.167637	.41194	.11025
.410	-.89977	.488660	1.191327	.012521	.098685	.272911	.171836	.45249	.12217
.450	-.87927	.536325	1.191937	.018068	.109740	.279867	.175945	.49218	.13408
.530	-.83255	.631750	1.193868	.030515	.132701	.294261	.183819	.56887	.15794
.610	-.77819	.727372	1.196874	.045004	.156838	.309261	.191080	.64181	.18184
.690	-.71616	.823283	1.201132	.061863	.182198	.324811	.197513	.71078	.20582
.770	-.64645	.919592	1.206846	.081484	.208821	.340835	.202865	.77557	.22990
.850	-.56901	1.016424	1.214255	.104334	.236741	.357233	.206841	.83595	.25411
.930	-.48380	1.113926	1.223640	.130960	.265985	.373883	.209089	.89171	.27848
1.010	-.39076	1.212268	1.235327	.162002	.296565	.390630	.209203	.94263	.30307
1.090	-.28981	1.311650	1.249698	.198193	.328483	.407286	.206708	.98851	.32791
1.170	-.18087	1.412303	1.267197	.240345	.361722	.423619	.201053	1.02916	.35308
1.250	-.06380	1.514498	1.288336	.289317	.396246	.439353	.191602	1.06441	.37862
1.330	.06150	1.618549	1.313692	.345928	.431994	.454155	.177629	1.09415	.40464

TABLE III.-  $T_e/T_w = 0.25$ ,  $f_w = -1.0$ ,  $B_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
1.410	.19522	1.724819	1.343904	.410804	.468875	.467631	.158313	1.11828	.43120
1.490	.33754	1.833722	1.379644	.484092	.506767	.479318	.132740	1.13677	.45843
1.530	.41200	1.889306	1.399794	.523694	.526042	.484325	.117303	1.14392	.47233
1.570	.48870	1.945727	1.421563	.564981	.545504	.488676	.099930	1.14968	.48643
1.610	.56767	2.003053	1.445010	.607574	.565126	.492292	.080495	1.15407	.50076
1.650	.64896	2.061351	1.470178	.650910	.584877	.495087	.058876	1.15712	.51534
1.690	.73260	2.120690	1.497082	.694200	.604721	.496971	.034957	1.15887	.53017
1.730	.81863	2.181140	1.525699	.736364	.624621	.497851	.008638	1.15935	.54529
1.770	.90710	2.242768	1.555957	.775971	.644534	.497629	-.020163	1.15861	.56069
1.810	.99807	2.305637	1.587717	.811160	.664415	.496205	-.051495	1.15671	.57641
1.850	1.09157	2.369803	1.620758	.839574	.684213	.493476	-.085371	1.15372	.59245
1.890	1.18767	2.435310	1.654753	.858283	.703874	.489342	-.121745	1.14970	.60883
1.930	1.28641	2.502190	1.689243	.863740	.723340	.483704	-.160506	1.14474	.62555
1.970	1.38786	2.570448	1.723618	.851761	.742549	.476472	-.201452	1.13893	.64261
2.010	1.49207	2.640067	1.757087	.817568	.761436	.467563	-.244277	1.13239	.66002
2.050	1.59908	2.710990	1.788657	.755920	.779931	.456911	-.288546	1.12520	.67775
2.090	1.70896	2.783118	1.817121	.661357	.797965	.444468	-.333683	1.11750	.69578
2.130	1.82175	2.856299	1.841056	.528606	.815465	.430215	-.378952	1.10939	.71407
2.170	1.93748	2.930320	1.858840	.353147	.832358	.414163	-.423454	1.10101	.73258
2.210	2.05618	3.004900	1.868700	.131955	.848574	.396363	-.466134	1.09249	.75122
2.230	2.11665	3.042292	1.870077	.003882	.856407	.386836	-.486422	1.08821	.76057
2.250	2.17787	3.079685	1.868779	-.135644	.864045	.376912	-.505801	1.08394	.76992
2.270	2.23984	3.117024	1.864578	-.286196	.871481	.366611	-.524108	1.07970	.77926
2.290	2.30255	3.154247	1.857262	-.447096	.878707	.355956	-.541178	1.07550	.78856
2.310	2.36601	3.191292	1.846632	-.617395	.885717	.344974	-.556848	1.07136	.79782
2.330	2.43020	3.228089	1.832512	-.795872	.892504	.333693	-.570960	1.06728	.80702
2.350	2.49513	3.264568	1.814753	-.981022	.899063	.322147	-.583360	1.06328	.81614
2.370	2.56078	3.300654	1.793239	-.1.171075	.905388	.310371	-.593908	1.05937	.82516
2.390	2.62715	3.336272	1.767891	-.1.364006	.911477	.298403	-.602476	1.05557	.83407
2.410	2.69423	3.371344	1.738674	-.1.557577	.917324	.286286	-.608951	1.05188	.84284
2.430	2.76200	3.405793	1.705600	-.1.749379	.922927	.274060	-.613243	1.04832	.85145
2.450	2.83046	3.439543	1.668728	-.1.936880	.928286	.261771	-.615286	1.04488	.85989
2.470	2.89958	3.472518	1.628171	-.2.117498	.933398	.249464	-.615036	1.04159	.86813
2.490	2.96935	3.504646	1.584091	-.2.288668	.938264	.237185	-.612480	1.03843	.87616
2.510	3.03976	3.535860	1.536703	-.2.447916	.942886	.224980	-.607633	1.03543	.88396
2.530	3.11078	3.566094	1.486269	-.2.592939	.947264	.212894	-.600538	1.03257	.89152

TABLE III.-  $T_e/T_w = 0.25$ ,  $f_w = -1.0$ ,  $F_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
2.550	3.18240	3.595292	1.433094	-2.721670	.951403	.200973	-.591269	1.02986	.89882
2.570	3.25458	3.623402	1.377522	-2.832346	.955305	.189257	-.579925	1.02731	.90585
2.590	3.32732	3.650380	1.319930	-2.923562	.958975	.177789	-.566635	1.02491	.91259
2.610	3.40059	3.676188	1.260716	-2.994308	.962418	.166604	-.551547	1.02267	.91905
2.630	3.47436	3.700800	1.200297	-3.043995	.965641	.155738	-.534833	1.02057	.92520
2.650	3.54862	3.724195	1.139097	-3.072462	.968650	.145220	-.516679	1.01861	.93105
2.670	3.62332	3.746362	1.077538	-3.079968	.971452	.135079	-.497283	1.01680	.93659
2.690	3.69846	3.767297	1.016033	-3.067166	.974056	.125336	-.476853	1.01513	.94182
2.710	3.77401	3.787006	.954979	-3.035068	.976468	.116010	-.455599	1.01359	.94675
2.730	3.84993	3.805502	.894750	-2.984997	.978699	.107116	-.433730	1.01217	.95138
2.750	3.92622	3.822804	.835688	-2.918530	.980756	.098664	-.411453	1.01088	.95570
2.770	4.00284	3.838939	.778106	-2.837438	.982649	.090659	-.388964	1.00969	.95973
2.790	4.07977	3.853940	.722275	-2.743625	.984385	.083105	-.366450	1.00862	.96348
2.810	4.15699	3.867843	.668432	-2.639069	.985976	.076000	-.344084	1.00764	.96696
2.830	4.23448	3.880692	.616771	-2.525765	.987428	.069340	-.322025	1.00676	.97017
2.850	4.31221	3.892530	.567447	-2.405677	.988752	.063116	-.300412	1.00597	.97313
2.870	4.39017	3.903406	.520577	-2.280689	.989956	.057320	-.279370	1.00526	.97585
2.890	4.46834	3.913370	.476240	-2.152578	.991048	.051937	-.259003	1.00462	.97834
2.910	4.54670	3.922473	.434484	-2.022981	.992036	.046954	-.239400	1.00405	.98062
2.930	4.62523	3.930766	.395321	-1.893380	.992929	.042356	-.220630	1.00354	.98269
2.950	4.70393	3.938303	.358740	-1.765086	.993733	.038123	-.202748	1.00309	.98458
2.970	4.78276	3.945133	.324702	-1.639237	.994456	.034240	-.185791	1.00269	.98628
2.990	4.86173	3.951307	.293148	-1.516797	.995104	.030685	-.169785	1.00233	.98783
3.010	4.94081	3.956875	.264002	-1.398561	.995685	.027442	-.154740	1.00202	.98922
3.030	5.02000	3.961883	.237174	-1.285162	.996204	.024489	-.140656	1.00175	.99047
3.050	5.09928	3.966376	.212560	-1.177086	.996667	.021809	-.127524	1.00151	.99159
3.070	5.17865	3.970399	.190053	-1.074681	.997078	.019382	-.115325	1.00130	.99260
3.090	5.25809	3.973992	.169534	-.978174	.997443	.017190	-.104034	1.00112	.99350
3.110	5.33761	3.977193	.150886	-.887687	.997767	.015215	-.093619	1.00096	.99430
3.130	5.41718	3.980039	.133986	-.803244	.998053	.013440	-.084044	1.00082	.99501
3.150	5.49681	3.982563	.118716	-.724791	.998306	.011848	-.075269	1.00070	.99564
3.170	5.57648	3.984798	.104956	-.652213	.998528	.010424	-.067254	1.00060	.99620
3.190	5.65620	3.986771	.092590	-.585337	.998724	.009153	-.059955	1.00051	.99669
3.210	5.73595	3.988510	.081506	-.523948	.998896	.008021	-.053326	1.00043	.99713
3.230	5.81574	3.990039	.071597	-.467801	.999046	.007016	-.047324	1.00037	.99751
3.250	5.89555	3.991381	.062761	-.416626	.999177	.006124	-.041905	1.00031	.99785

TABLE III.-  $T_e/T_w = 0.25$ ,  $f_w = -1.0$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
3.270	5.97539	3.992556	.054901	-.370139	.999291	.005336	-.037025	1.00026	.99814
3.290	6.05525	3.993583	.047926	-.328045	.999391	.004640	-.032642	1.00022	.99840
3.310	6.13513	3.994478	.041752	-.290048	.999478	.004027	-.028717	1.00018	.99862
3.350	6.29494	3.995934	.031495	-.225167	.999618	.003016	-.022084	1.00013	.99898
3.390	6.45480	3.997029	.023567	-.173210	.999722	.002242	-.016841	1.00009	.99926
3.430	6.61470	3.997844	.017495	-.132056	.999799	.001654	-.012736	1.00006	.99946
3.470	6.77463	3.998448	.012884	-.099797	.999856	.001211	-.009552	1.00004	.99961
3.510	6.93457	3.998890	.009414	-.074766	.999898	.000880	-.007106	1.00003	.99972
3.550	7.09454	3.999213	.006824	-.055533	.999928	.000635	-.005244	1.00002	.99980
3.590	7.25451	3.999446	.004908	-.040899	.999949	.000454	-.003838	1.00001	.99986
3.630	7.41449	3.999612	.003503	-.029869	.999965	.000323	-.002787	1.00001	.99990
3.670	7.57448	3.999731	.002481	-.021631	.999976	.000227	-.002007	1.00001	.99993
3.710	7.73447	3.999815	.001743	-.015537	.999983	.000159	-.001434	1.00000	.99995
3.750	7.89446	3.999873	.001215	-.011067	.999989	.000111	-.001017	1.00000	.99997
3.790	8.05446	3.999914	.000841	-.007818	.999992	.000076	-.000715	1.00000	.99998
3.830	8.21446	3.999942	.000577	-.005478	.999995	.000052	-.000499	1.00000	.99999
3.870	8.37445	3.999961	.000393	-.003807	.999997	.000035	-.000345	1.00000	.99999
3.910	8.53445	3.999974	.000265	-.002624	.999998	.000024	-.000237	1.00000	.99999
3.950	8.69445	3.999983	.000178	-.001794	.999999	.000016	-.000162	1.00000	1.00000
3.990	8.85445	3.999989	.000118	-.001217	.999999	.000011	-.000109	1.00000	1.00000
4.030	9.01445	3.999993	.000078	-.000818	1.000000	.000007	-.000073	1.00000	1.00000
4.070	9.17445	3.999996	.000051	-.000546	1.000000	.000005	-.000049	1.00000	1.00000
4.110	9.33445	3.999997	.000033	-.000361	1.000000	.000003	-.000032	1.00000	1.00000
4.150	9.49445	3.999998	.000021	-.000237	1.000000	.000002	-.000021	1.00000	1.00000
4.190	9.65445	3.999999	.000013	-.000154	1.000000	.000001	-.000014	1.00000	1.00000
4.230	9.81445	3.999999	.000008	-.000100	1.000000	.000001	-.000009	1.00000	1.00000
4.270	9.97445	4.000000	.000005	-.000064	1.000000	.000000	-.000006	1.00000	1.00000
4.350	10.29445	4.000000	.000002	-.000026	1.000000	.000000	-.000002	1.00000	1.00000
4.430	10.61445	4.000000	.000000	-.000010	1.000000	.000000	-.000001	1.00000	1.00000
4.510	10.93445	4.000000	-.000000	-.000004	1.000000	.000000	-.000000	1.00000	1.00000

TABLE IV.-  $T_e/T_w = 0.5$ ,  $f_w = 0$ ,  $E_u = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
.000	.00000	.000000	1.048493	-.093747	.000000	.404757	.069627	.000000	.000000
.005	.00001	.005241	1.048024	-.094046	.002025	.405106	.069815	.00524	.00262
.010	.00005	.010480	1.047553	-.094347	.004051	.405455	.069999	.01046	.00524
.015	.00012	.015717	1.047080	-.094649	.006079	.405806	.070179	.01567	.00786
.020	.00021	.020951	1.046606	-.094953	.008109	.406157	.070355	.02087	.01048
.025	.00033	.026183	1.046131	-.095259	.010141	.406509	.070527	.02605	.01309
.030	.00047	.031412	1.045653	-.095567	.012174	.406862	.070694	.03122	.01571
.040	.00084	.041864	1.044695	-.096188	.016246	.407571	.071016	.04152	.02093
.050	.00131	.052306	1.043730	-.096816	.020326	.408282	.071322	.05177	.02615
.060	.00188	.062739	1.042758	-.097451	.024412	.408997	.071609	.06197	.03137
.070	.00256	.073161	1.041781	-.098095	.028506	.409715	.071880	.07212	.03658
.080	.00335	.083574	1.040796	-.098746	.032606	.410435	.072133	.08221	.04179
.090	.00423	.093977	1.039806	-.099405	.036714	.411157	.072367	.09225	.04699
.110	.00632	.114753	1.037804	-.100750	.044952	.412609	.072782	.11217	.05738
.130	.00882	.135489	1.035775	-.102129	.053219	.414068	.073123	.13188	.06774
.150	.01174	.156184	1.033719	-.103545	.061515	.415533	.073388	.15138	.07809
.170	.01507	.176838	1.031633	-.105000	.069840	.417003	.073575	.17066	.08842
.190	.01881	.197449	1.029519	-.106495	.078195	.418476	.073683	.18973	.09872
.210	.02297	.218018	1.027373	-.108032	.086579	.419950	.073709	.20858	.10901
.250	.03251	.259026	1.022988	-.111242	.103436	.422895	.073508	.24563	.12951
.290	.04369	.299856	1.018471	-.114645	.120411	.425826	.072956	.28180	.14993
.330	.05650	.340502	1.013814	-.118258	.137502	.428727	.072037	.31709	.17025
.370	.07093	.380959	1.009008	-.122098	.154708	.431584	.070735	.35149	.19048
.410	.08697	.421220	1.004043	-.126185	.172028	.434380	.069030	.38499	.21061
.450	.10462	.461280	.998909	-.130538	.189457	.437100	.066906	.41758	.23064
.530	.14471	.540765	.988091	-.140124	.224634	.442242	.061330	.48003	.27038
.610	.19112	.619353	.976454	-.151027	.260202	.446863	.053864	.53877	.30968
.690	.24378	.696973	.963887	-.163428	.296114	.450806	.044375	.59378	.34849
.770	.30261	.773546	.950261	-.177513	.332309	.453906	.032745	.64502	.38677
.850	.36752	.848983	.935435	-.193466	.368712	.455986	.018877	.69247	.42449
.930	.43841	.923180	.919252	-.211459	.405234	.456865	.002713	.73613	.46159
1.010	.51519	.996022	.901543	-.231637	.441773	.456358	-.015761	.77601	.49801
1.090	.59774	1.067381	.882129	-.254099	.478210	.454283	-.036494	.81217	.53369
1.170	.68593	1.137112	.860826	-.278875	.514412	.450463	-.059355	.84464	.56856
1.250	.77963	1.205058	.837449	-.305895	.550233	.444736	-.084122	.87353	.60253
1.330	.87868	1.271044	.811828	-.334957	.585515	.436962	-.110462	.89894	.63552

TABLE IV.-  $T_e/T_w = 0.5$ ,  $f_w = 0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
1.410	1.98294	1.334886	0.783812	-0.365691	0.620089	0.427032	-0.137920	0.92101	0.66744
1.490	1.09220	1.396387	0.753288	-0.397530	0.653781	0.414880	-0.165918	0.93992	0.69819
1.570	1.20629	1.455344	0.720199	-0.429683	0.686410	0.400490	-0.193754	0.95586	0.72767
1.650	1.32499	1.511551	0.684558	-0.461131	0.717800	0.383906	-0.220622	0.96905	0.75578
1.730	1.44806	1.564808	0.646470	-0.490646	0.747780	0.365240	-0.245637	0.97974	0.78240
1.810	1.57527	1.614926	0.606144	-0.516844	0.776188	0.344678	-0.267885	0.98818	0.80746
1.890	1.70636	1.661740	0.563903	-0.538273	0.802885	0.322476	-0.286480	0.99465	0.83087
1.970	1.84106	1.705112	0.520184	-0.553537	0.827750	0.298960	-0.300630	0.99941	0.85256
2.050	1.97908	1.744945	0.475532	-0.561434	0.850694	0.274510	-0.309713	1.00274	0.87247
2.130	2.12015	1.781190	0.430573	-0.561107	0.871658	0.249550	-0.313334	1.00490	0.89059
2.130	2.12015	1.781190	0.430573	-0.561107	0.871658	0.249550	-0.313334	1.00490	0.89059
2.170	2.19174	1.797964	0.408189	-0.557715	0.881390	0.237018	-0.313049	1.00561	0.89898
2.210	2.26398	1.813847	0.385985	-0.552159	0.890620	0.224525	-0.311377	1.00612	0.90692
2.250	2.33683	1.828847	0.364045	-0.544473	0.899353	0.212126	-0.308349	1.00646	0.91442
2.290	2.41027	1.842975	0.342454	-0.534725	0.907592	0.199874	-0.304016	1.00664	0.92149
2.330	2.48426	1.856249	0.321293	-0.523016	0.915346	0.187821	-0.298443	1.00669	0.92812
2.370	2.55876	1.868686	0.300637	-0.509476	0.922621	0.176014	-0.291713	1.00664	0.93434
2.410	2.63375	1.880307	0.280557	-0.494263	0.929431	0.164498	-0.283920	1.00650	0.94015
2.450	2.70918	1.891139	0.261116	-0.477554	0.935786	0.153313	-0.275170	1.00629	0.94557
2.490	2.78503	1.901206	0.242370	-0.459547	0.941701	0.142496	-0.265579	1.00602	0.95060
2.530	2.86126	1.910538	0.224367	-0.440448	0.947191	0.132076	-0.255267	1.00572	0.95527
2.570	2.93786	1.919166	0.207146	-0.420474	0.952272	0.122082	-0.244360	1.00538	0.95958
2.610	3.01479	1.927121	0.190738	-0.399840	0.956963	0.112534	-0.232984	1.00503	0.96356
2.650	3.09202	1.934436	0.175165	-0.378759	0.961281	0.103448	-0.221261	1.00467	0.96722
2.730	3.24730	1.947282	0.146571	-0.336070	0.968874	0.086705	-0.197257	1.00395	0.97364
2.810	3.40353	1.957978	0.121380	-0.293896	0.975205	0.071888	-0.173235	1.00326	0.97899
2.890	3.56053	1.966792	0.099501	-0.253469	0.980427	0.058968	-0.149949	1.00264	0.98340
2.970	3.71817	1.973981	0.080755	-0.215722	0.984688	0.047861	-0.127993	1.00210	0.98699
3.050	3.87633	1.979789	0.064900	-0.181281	0.988129	0.038443	-0.107789	1.00165	0.98989
3.130	4.03491	1.984434	0.051655	-0.150496	0.990880	0.030563	-0.089601	1.00127	0.99222
3.210	4.19382	1.988115	0.040722	-0.123484	0.993055	0.024052	-0.073550	1.00096	0.99406
3.290	4.35298	1.991003	0.031801	-0.100179	0.994760	0.018739	-0.059643	1.00072	0.99550
3.370	4.51236	1.993248	0.024602	-0.080382	0.996081	0.014455	-0.047795	1.00053	0.99662
3.450	4.67189	1.994978	0.018855	-0.063806	0.997095	0.011041	-0.037860	1.00039	0.99749
3.530	4.83154	1.996297	0.014316	-0.050116	0.997867	0.008352	-0.029653	1.00028	0.99815
3.610	4.99129	1.997295	0.010769	-0.038954	0.998448	0.006256	-0.022969	1.00020	0.99865

TABLE IV.-  $T_e/T_w = 0.5$ ,  $f_w = 0$ ,  $F_u = 1/3$  - ConcludedN<sub>CO</sub>

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
3.690	5.15110	1.998042	.008025	-.029966	.998881	.004642	-.017599	1.000014	.99902
3.770	5.31097	1.998596	.005925	-.022816	.999201	.003411	-.013340	1.000010	.99930
3.850	5.47088	1.999004	.004334	-.017195	.999435	.002482	-.010005	1.000007	.99950
3.930	5.63081	1.999300	.003140	-.012827	.999604	.001790	-.007426	1.000005	.99965
4.010	5.79076	1.999514	.002254	-.009471	.999726	.001278	-.005454	1.000003	.99976
4.090	5.95073	1.999667	.001603	-.006922	.999812	.000904	-.003965	1.000002	.99983
4.170	6.11071	1.999776	.001129	-.005007	.999873	.000633	-.002853	1.000001	.99989
4.250	6.27069	1.999852	.000788	-.003585	.999916	.000439	-.002031	1.000001	.99993
4.330	6.43068	1.999904	.000545	-.002541	.999945	.000302	-.001432	1.000001	.99995
4.410	6.59068	1.999941	.000374	-.001782	.999965	.000206	-.000999	1.000001	.99997
4.490	6.75067	1.999966	.000254	-.001238	.999979	.000139	-.000690	1.000000	.99998
4.570	6.91067	1.999982	.000171	-.000850	.999988	.000093	-.000472	1.000000	.99999
4.650	7.07067	1.999994	.000115	-.000578	.999994	.000061	-.000319	1.000000	1.00000
4.730	7.23067	2.000001	.000076	-.000389	.999998	.000040	-.000214	1.000000	1.00000
4.810	7.39067	2.000006	.000051	-.000259	1.000001	.000026	-.000142	1.000000	1.00000
4.890	7.55067	2.000010	.000034	-.000171	1.000002	.000017	-.000093	1.000000	1.00000
4.970	7.71067	2.000012	.000022	-.000112	1.000003	.000011	-.000061	1.000000	1.00001
5.050	7.87067	2.000013	.000015	-.000072	1.000004	.000007	-.000039	1.000000	1.00001
5.130	8.03067	2.000014	.000010	-.000046	1.000005	.000004	-.000025	1.000000	1.00001
5.210	8.19067	2.000015	.000007	-.000029	1.000005	.000003	-.000016	1.000000	1.00001
5.290	8.35068	2.000016	.000006	-.000018	1.000005	.000002	-.000010	1.000000	1.00001
5.450	8.67068	2.000016	.000004	-.000007	1.000005	.000001	-.000004	1.000000	1.00001
5.610	8.99068	2.000017	.000003	-.000003	1.000005	.000000	-.000001	1.000000	1.00001

TABLE V.-  $T_e/T_w = 0.5$ ,  $f_w = -0.5$ ,  $Bu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
.000	-.50000	.000000	.867422	-.057654	.000000	.273157	.095448	.00000	.00000
.005	-.49999	.004336	.867133	-.057762	.001367	.273635	.095720	.00433	.00217
.010	-.49996	.008671	.866844	-.057871	.002736	.274115	.095990	.00866	.00434
.015	-.49990	.013005	.866554	-.057980	.004108	.274595	.096259	.01298	.00650
.020	-.49983	.017337	.866264	-.058090	.005482	.275077	.096526	.01729	.00867
.025	-.49973	.021667	.865973	-.058200	.006859	.275560	.096791	.02159	.01083
.030	-.49961	.025997	.865682	-.058311	.008238	.276045	.097055	.02589	.01300
.040	-.49931	.034651	.865098	-.058535	.011003	.277018	.097578	.03446	.01733
.050	-.49892	.043299	.864511	-.058761	.013778	.277997	.098094	.04300	.02165
.060	-.49844	.051941	.863923	-.058990	.016563	.278980	.098603	.05151	.02597
.070	-.49788	.060577	.863332	-.059222	.019358	.279969	.099106	.05999	.03029
.080	-.49723	.069207	.862738	-.059456	.022163	.280962	.099601	.06844	.03460
.090	-.49649	.077832	.862143	-.059693	.024977	.281961	.100089	.07686	.03892
.110	-.49477	.095063	.860944	-.060175	.030636	.283972	.101043	.09361	.04753
.130	-.49269	.112269	.859735	-.060669	.036336	.286002	.101966	.11023	.05613
.150	-.49027	.129452	.858517	-.061176	.042077	.288050	.102857	.12673	.06473
.170	-.48751	.146610	.857288	-.061697	.047858	.290116	.103715	.14310	.07331
.190	-.48441	.163743	.856049	-.062231	.053681	.292199	.104538	.15935	.08187
.210	-.48096	.180852	.854799	-.062780	.059546	.294298	.105325	.17547	.09043
.250	-.47305	.214993	.852265	-.063925	.071403	.298540	.106786	.20732	.10750
.290	-.46377	.249033	.849684	-.065138	.083430	.302838	.108085	.23864	.12452
.330	-.45313	.282967	.847053	-.066427	.095631	.307185	.109210	.26944	.14148
.370	-.44113	.316796	.844369	-.067798	.108006	.311573	.110147	.29969	.15840
.410	-.42778	.350516	.841628	-.069260	.120557	.315994	.110884	.32939	.17526
.450	-.41309	.384125	.838827	-.070821	.133286	.320440	.111406	.35853	.19206
.530	-.37968	.451001	.833026	-.074274	.159278	.329373	.111742	.41508	.22550
.610	-.34094	.517402	.826929	-.078237	.185985	.338291	.111030	.46929	.25870
.690	-.29691	.583301	.820492	-.082797	.213402	.347106	.109134	.52106	.29165
.770	-.24763	.648670	.813663	-.088054	.241516	.355717	.105914	.57034	.32434
.850	-.19314	.713475	.806382	-.094118	.270308	.364013	.101224	.61705	.35674
.930	-.13349	.777677	.798580	-.101108	.299747	.371870	.094919	.66112	.38884
1.010	-.06873	.841232	.790177	-.109157	.329792	.379153	.086857	.70252	.42062
1.090	.00109	.904087	.781083	-.118404	.360392	.385717	.076905	.74117	.45204
1.170	.07591	.966184	.771196	-.128994	.391483	.391405	.064947	.77706	.48309
1.250	.15566	1.027454	.760404	-.141072	.422989	.396053	.050891	.81015	.51373
1.330	.24027	1.087821	.748581	-.154779	.454819	.399490	.034682	.84044	.54391

TABLE V.-  $T_e/T_w = 0.5$ ,  $f_w = -0.5$ ,  $E_u = 1/3$  - Continued

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$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_{e\infty}$
1.410	.32968	1.147196	.735592	-.170241	.486870	.401544	.016308	.86793	.57360
1.490	.42380	1.205481	.721293	-.187551	.519025	.402043	-.004180	.89264	.60274
1.570	.52253	1.262564	.705534	-.206758	.551151	.400822	-.026659	.91463	.63128
1.650	.62577	1.318323	.688162	-.227845	.583106	.397730	-.050919	.93396	.65916
1.730	.73342	1.372623	.669031	-.250700	.614735	.392636	-.076650	.95072	.68631
1.810	.84535	1.425317	.648009	-.275093	.645872	.385439	-.103435	.96503	.71266
1.890	.96142	1.476251	.624985	-.300649	.676347	.376073	-.130744	.97702	.73813
1.970	1.08150	1.525260	.599889	-.326826	.705985	.364523	-.157938	.98685	.76263
2.050	1.20541	1.572177	.572696	-.352905	.734613	.350826	-.184284	.99471	.78609
2.130	1.33299	1.616836	.543451	-.377995	.762063	.335082	-.208982	1.00077	.80842
2.210	1.46404	1.659077	.512271	-.401060	.788176	.317455	-.231204	1.00525	.82954
2.290	1.59837	1.698754	.479365	-.420979	.812812	.298177	-.250144	1.00837	.84938
2.370	1.73577	1.735738	.445029	-.436621	.835849	.277539	-.265077	1.01033	.86787
2.450	1.87601	1.769931	.409647	-.446953	.857192	.255886	-.275420	1.01135	.88497
2.530	2.01888	1.801266	.373680	-.451147	.876774	.233603	-.280787	1.01161	.90063
2.610	2.16414	1.829718	.337640	-.448682	.894563	.211096	-.281032	1.01132	.91486
2.690	2.31156	1.855302	.302070	-.439417	.910555	.188771	-.276265	1.01062	.92765
2.770	2.46091	1.878077	.267506	-.423620	.924781	.167016	-.266852	1.00967	.93904
2.850	2.61198	1.898144	.234446	-.401952	.937302	.146181	-.253377	1.00858	.94907
2.930	2.76455	1.915640	.203322	-.375395	.948203	.126562	-.236595	1.00743	.95782
3.010	2.91842	1.930736	.174479	-.345153	.957591	.108390	-.217364	1.00631	.96537
3.090	3.07341	1.943624	.148160	-.312530	.965588	.091825	-.196575	1.00525	.97181
3.170	3.22934	1.954513	.124503	-.278820	.972328	.076957	-.175082	1.00430	.97726
3.250	3.38608	1.963616	.103547	-.245202	.977947	.063811	-.153659	1.00346	.98181
3.330	3.54348	1.971150	.085243	-.212678	.982582	.052354	-.132953	1.00274	.98558
3.410	3.70143	1.977322	.069470	-.182031	.986366	.042507	-.113468	1.00214	.98866
3.490	3.85982	1.982328	.056055	-.153820	.989423	.034158	-.095563	1.00165	.99116
3.570	4.01857	1.986348	.044787	-.128386	.991867	.027170	-.079458	1.00125	.99317
3.650	4.17761	1.989544	.035437	-.105885	.993802	.021395	-.065252	1.00094	.99477
3.730	4.33688	1.992062	.027768	-.086321	.995319	.016680	-.052942	1.00069	.99603
3.810	4.49633	1.994026	.021551	-.069580	.996495	.012877	-.042453	1.00051	.99701
3.890	4.65592	1.995543	.016566	-.055468	.997399	.009843	-.033654	1.00037	.99777
3.970	4.81561	1.996704	.012613	-.043738	.998087	.007452	-.026380	1.00026	.99835
4.050	4.97538	1.997584	.009512	-.034120	.998606	.005587	-.020451	1.00018	.99879
4.130	5.13521	1.998244	.007105	-.026335	.998992	.004149	-.015684	1.00013	.99912
4.210	5.29509	1.998736	.005257	-.020113	.999279	.003051	-.011900	1.00009	.99937

TABLE V.-  $T_e/T_w = 0.5$ ,  $f_w = -0.5$ ,  $\text{Eu} = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
4.290	5.45501	1.999097	.003852	-.015200	.999488	.002223	-.008933	1.00006	.99955
4.370	5.61495	1.999361	.002796	-.011368	.999640	.001604	-.006637	1.00004	.99968
4.450	5.77490	1.999552	.002010	-.008413	.999749	.001146	-.004879	1.00003	.99978
4.530	5.93487	1.999688	.001431	-.006162	.999827	.000812	-.003550	1.00002	.99984
4.610	6.09485	1.999785	.001008	-.004466	.999881	.000569	-.002557	1.00001	.99989
4.690	6.25484	1.999853	.000704	-.003204	.999919	.000395	-.001823	1.00001	.99993
4.770	6.41483	1.999900	.000487	-.002274	.999946	.000272	-.001286	1.00000	.99995
4.850	6.57482	1.999933	.000333	-.001598	.999964	.000185	-.000898	1.00000	.99997
4.930	6.73482	1.999955	.000226	-.001111	.999976	.000125	-.000621	1.00000	.99998
5.010	6.89482	1.999970	.000151	-.000765	.999985	.000084	-.000425	1.00000	.99998
5.090	7.05481	1.999980	.000101	-.000521	.999990	.000055	-.000288	1.00000	.99999
5.170	7.21481	1.999986	.000066	-.000351	.999994	.000036	-.000193	1.00000	.99999
5.250	7.37481	1.999991	.000043	-.000234	.999996	.000024	-.000128	1.00000	1.00000
5.330	7.53481	1.999993	.000027	-.000155	.999998	.000015	-.000084	1.00000	1.00000
5.410	7.69481	1.999995	.000017	-.000101	.999999	.000010	-.000055	1.00000	1.00000
5.490	7.85481	1.999996	.000011	-.000065	.999999	.000006	-.000035	1.00000	1.00000
5.570	8.01481	1.999997	.000007	-.000042	1.000000	.000004	-.000023	1.00000	1.00000
5.650	8.17481	1.999997	.000004	-.000026	1.000000	.000002	-.000014	1.00000	1.00000
5.810	8.49481	1.999998	.000001	-.000011	1.000000	.000001	-.000006	1.00000	1.00000
5.970	8.81481	1.999998	.000000	-.000004	1.000000	.000000	-.000002	1.00000	1.00000

TABLE VI.-  $T_e/T_w = 0.5$ ,  $f_w = -1.0$ ,  $Eu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
.000	-1.00000	.000000	.711247	-.031995	.000000	.167163	.089886	.00000	.00000
.005	-.99999	.003556	.711087	-.032030	.000837	.167613	.090186	.00355	.00178
.010	-.99996	.007111	.710926	-.032065	.001676	.168065	.090486	.00710	.00356
.015	-.99992	.010665	.710766	-.032100	.002518	.168518	.090786	.01065	.00533
.020	-.99986	.014219	.710605	-.032135	.003361	.168973	.091085	.01419	.00711
.025	-.99978	.017771	.710445	-.032170	.004207	.169429	.091385	.01773	.00889
.030	-.99968	.021323	.710284	-.032205	.005056	.169887	.091685	.02127	.01066
.040	-.99943	.028424	.709961	-.032276	.006759	.170807	.092284	.02833	.01421
.050	-.99911	.035522	.709638	-.032348	.008472	.171732	.092883	.03537	.01776
.060	-.99872	.042617	.709314	-.032419	.010194	.172664	.093481	.04240	.02131
.070	-.99826	.049708	.708990	-.032492	.011925	.173602	.094078	.04941	.02485
.080	-.99773	.056797	.708665	-.032565	.013666	.174546	.094675	.05641	.02840
.090	-.99712	.063882	.708339	-.032638	.015416	.175496	.095272	.06339	.03194
.110	-.99570	.078042	.707684	-.032786	.018945	.177413	.096461	.07730	.03902
.130	-.99400	.092189	.707027	-.032937	.022513	.179354	.097647	.09115	.04609
.150	-.99202	.106323	.706367	-.033090	.026119	.181319	.098829	.10493	.05316
.170	-.98975	.120444	.705703	-.033246	.029766	.183307	.100005	.11865	.06022
.190	-.98720	.134551	.705037	-.033405	.033452	.185319	.101175	.13230	.06728
.210	-.98437	.148645	.704367	-.033568	.037179	.187354	.102338	.14588	.07432
.250	-.97786	.176793	.703018	-.033903	.044755	.191494	.104642	.17284	.08840
.290	-.97022	.204886	.701655	-.034254	.052499	.195725	.106908	.19951	.10244
.330	-.96147	.232925	.700277	-.034622	.060414	.200046	.109131	.22589	.11646
.370	-.95159	.260908	.698885	-.035012	.068504	.204455	.111302	.25197	.13045
.410	-.94060	.288836	.697476	-.035424	.076772	.208949	.113414	.27775	.14442
.450	-.92848	.316706	.696050	-.035861	.085221	.213527	.115457	.30321	.15835
.530	-.90092	.372275	.693144	-.036826	.102677	.222920	.119302	.35316	.18614
.610	-.86893	.427607	.690155	-.037932	.120896	.232605	.122758	.40176	.21380
.690	-.83251	.482697	.687070	-.039211	.139901	.242548	.125734	.44893	.24135
.770	-.79170	.537535	.683875	-.040700	.159710	.252707	.128133	.49461	.26877
.850	-.74651	.592113	.680551	-.042440	.180338	.263031	.129848	.53872	.29606
.930	-.69697	.646420	.677077	-.044479	.201797	.273461	.130761	.58120	.32321
1.010	-.64310	.700441	.673425	-.046871	.224093	.283928	.130747	.62196	.35022
1.090	-.58491	.754162	.669566	-.049680	.247225	.294352	.129674	.66094	.37708
1.170	-.52244	.807565	.665464	-.052976	.271186	.304644	.127402	.69807	.40378
1.250	-.45571	.860629	.661075	-.056838	.295961	.314701	.123788	.73327	.43031
1.330	-.38475	.913328	.656352	-.061356	.321529	.324410	.118686	.76650	.45666

TABLE VI.-  $T_e/T_w = 0.5$ ,  $f_w = -1.0$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
1.410	-.30959	.965635	.651238	-.066629	.347854	.333647	.111954	.79768	.48282
1.490	-.23026	1.017514	.645668	-.072766	.374896	.342276	.103455	.82678	.50876
1.570	-.14680	1.068927	.639569	-.079885	.402598	.350150	.093062	.85375	.53446
1.650	-.05924	1.119829	.632857	-.088113	.430895	.357113	.080671	.87856	.55991
1.730	.03236	1.170166	.625438	-.097579	.459708	.363002	.066203	.90120	.58508
1.810	.12797	1.219877	.617208	-.108414	.488942	.367649	.049616	.92165	.60994
1.890	.22752	1.268894	.608052	-.120741	.518494	.370884	.030916	.93994	.63445
1.970	.33097	1.317137	.597846	-.134667	.548242	.372541	.010171	.95608	.65857
2.050	.43824	1.364518	.586460	-.150267	.578054	.372461	-.012480	.97014	.68226
2.130	.54927	1.410936	.573758	-.167567	.607785	.370500	-.036809	.98216	.70547
2.210	.66396	1.456281	.559605	-.186526	.637280	.366535	-.062498	.99225	.72814
2.290	.78224	1.500431	.543874	-.207007	.666375	.360475	-.089121	1.00051	.75022
2.370	.90400	1.543255	.526451	-.228757	.694899	.352265	-.116150	1.00705	.77163
2.450	1.02912	1.584615	.507250	-.251383	.722680	.341898	-.142958	1.01203	.79231
2.530	1.15749	1.624366	.486221	-.274338	.749546	.329417	-.168834	1.01560	.81218
2.610	1.28897	1.662362	.463366	-.296916	.775333	.314930	-.193012	1.01792	.83118
2.690	1.42342	1.698458	.438748	-.318271	.799886	.298602	-.214708	1.01917	.84923
2.770	1.56067	1.732518	.412501	-.337456	.823067	.280662	-.233169	1.01953	.86626
2.850	1.70057	1.764420	.384839	-.353482	.844757	.261398	-.247726	1.01917	.88221
2.930	1.84292	1.794063	.356054	-.365402	.864864	.241144	-.257853	1.01825	.89703
3.010	1.98755	1.821369	.326506	-.372408	.883324	.220268	-.263209	1.01694	.91068
3.090	2.13428	1.846295	.296614	-.373919	.900101	.199159	-.263684	1.01537	.92315
3.170	2.28290	1.868831	.266832	-.369656	.915194	.178204	-.259405	1.01366	.93442
3.250	2.43323	1.889004	.237620	-.359681	.928628	.157770	-.250731	1.01191	.94450
3.330	2.58508	1.906877	.209422	-.344400	.940460	.138188	-.238224	1.01021	.95344
3.410	2.73827	1.922549	.182637	-.324519	.950769	.119737	-.222600	1.00860	.96127
3.490	2.89263	1.936146	.157596	-.300972	.959654	.102633	-.204663	1.00713	.96807
3.570	3.04800	1.947818	.134550	-.274823	.967230	.087030	-.185247	1.00582	.97391
3.650	3.20423	1.957732	.113663	-.247170	.973621	.073012	-.165152	1.00469	.97887
3.730	3.36119	1.966063	.095015	-.219058	.978954	.060605	-.145097	1.00372	.98303
3.810	3.51877	1.972993	.078603	-.191407	.983359	.049780	-.125689	1.00291	.98650
3.890	3.67684	1.978697	.064358	-.164972	.986959	.040465	-.107402	1.00225	.98935
3.970	3.83533	1.983345	.052161	-.140321	.989871	.032558	-.090573	1.00172	.99167
4.050	3.99415	1.987093	.041851	-.117840	.992202	.025930	-.075412	1.00129	.99355
4.130	4.15324	1.990086	.033244	-.097745	.994050	.020446	-.062017	1.00096	.99504
4.210	4.31255	1.992452	.026147	-.080109	.995500	.015962	-.050391	1.00071	.99623

TABLE VI.-  $T_e/T_w = 0.5$ ,  $f_w = -1.0$ ,  $\text{Eu} = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
4.290	4.47202	1.994304	.020363	-.064891	.996627	.012339	-.040468	1.00052	.99715
4.370	4.63163	1.995740	.015704	-.051965	.997493	.009445	-.032128	1.00037	.99787
4.450	4.79133	1.996842	.011993	-.041148	.998154	.007160	-.025223	1.00026	.99842
4.530	4.95111	1.997680	.009071	-.032224	.998652	.005376	-.019584	1.00019	.99884
4.610	5.11095	1.998310	.006794	-.024960	.999025	.003998	-.015042	1.00013	.99916
4.690	5.27084	1.998781	.005039	-.019126	.999301	.002944	-.011431	1.00009	.99939
4.770	5.43076	1.999128	.003701	-.014498	.999503	.002148	-.008594	1.00006	.99956
4.850	5.59070	1.999382	.002692	-.010874	.999650	.001552	-.006395	1.00004	.99969
4.930	5.75066	1.999565	.001939	-.008069	.999755	.001111	-.004709	1.00003	.99978
5.010	5.91063	1.999697	.001383	-.005924	.999831	.000788	-.003431	1.00002	.99985
5.090	6.07061	1.999791	.000977	-.004304	.999884	.000553	-.002475	1.00001	.99990
5.170	6.23059	1.999857	.000684	-.003094	.999921	.000385	-.001767	1.00001	.99993
5.250	6.39058	1.999903	.000473	-.002201	.999947	.000265	-.001249	1.00000	.99995
5.330	6.55058	1.999934	.000325	-.001550	.999964	.000181	-.000874	1.00000	.99997
5.410	6.71057	1.999956	.000220	-.001080	.999976	.000122	-.000605	1.00000	.99998
5.490	6.87057	1.999970	.000148	-.000744	.999985	.000082	-.000415	1.00000	.99999
5.570	7.03057	1.999980	.000099	-.000508	.999990	.000054	-.000281	1.00000	.99999
5.650	7.19057	1.999986	.000065	-.000343	.999993	.000036	-.000189	1.00000	.99999
5.730	7.35056	1.999991	.000042	-.000229	.999996	.000023	-.000126	1.00000	1.00000
5.810	7.51056	1.999993	.000027	-.000151	.999997	.000015	-.000083	1.00000	1.00000
5.890	7.67056	1.999995	.000017	-.000099	.999998	.000010	-.000054	1.00000	1.00000
5.970	7.83056	1.999996	.000011	-.000064	.999999	.000006	-.000035	1.00000	1.00000
6.050	7.99056	1.999997	.000007	-.000041	.999999	.000004	-.000022	1.00000	1.00000
6.210	8.31056	1.999998	.000002	-.000017	1.000000	.000001	-.000009	1.00000	1.00000
6.370	8.63056	1.999998	.000001	-.000007	1.000000	.000001	-.000003	1.00000	1.00000
6.530	8.95056	1.999998	-.000000	-.000003	1.000000	.000000	-.000001	1.00000	1.00000

TABLE VII.-  $T_e/T_w = 1.0$ ,  $f_w = 0$ ,  $Eu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/peue$
.000	.00000	.000000	.757448	-333333	.000000	.384156	-000000	.000000	.000000
.005	.00001	.003783	.755781	-333333	.001921	.384156	-000002	.00378	.00378
.010	.00004	.007558	.754115	-333333	.003842	.384156	-000007	.00756	.00756
.015	.00009	.011324	.752448	-333333	.005762	.384156	-000015	.01132	.01132
.020	.00015	.015082	.750781	-333333	.007683	.384156	-000027	.01508	.01508
.025	.00024	.018832	.749115	-333333	.009604	.384156	-000042	.01883	.01883
.030	.00034	.022573	.747448	-333333	.011525	.384155	-000061	.02257	.02257
.040	.00060	.030031	.744115	-333332	.015366	.384155	-000108	.03003	.03003
.050	.00094	.037456	.740781	-333330	.019208	.384153	-000168	.03746	.03746
.060	.00135	.044847	.737448	-333327	.023049	.384151	-000242	.04485	.04485
.070	.00184	.052205	.734115	-333324	.026891	.384148	-000329	.05220	.05220
.080	.00240	.059529	.730782	-333319	.030732	.384145	-000429	.05953	.05953
.090	.00303	.066820	.727448	-333313	.034574	.384140	-000543	.06682	.06682
.110	.00451	.081303	.720782	-333296	.042256	.384126	-000808	.08130	.08130
.130	.00628	.095652	.714117	-333273	.049939	.384107	-001125	.09565	.09565
.150	.00833	.109867	.707451	-333240	.057621	.384081	-001494	.10987	.10987
.170	.01067	.123950	.700787	-333198	.065302	.384047	-001913	.12395	.12395
.190	.01329	.137899	.694124	-333145	.072982	.384004	-002382	.13790	.13790
.210	.01619	.151715	.687461	-333080	.080662	.383951	-002900	.15171	.15171
.250	.02280	.178947	.674141	-332907	.096017	.383812	-004084	.17895	.17895
.290	.03050	.205646	.660830	-332672	.111366	.383622	-005459	.20565	.20565
.330	.03925	.231813	.647529	-332363	.126706	.383373	-007022	.23181	.23181
.370	.04903	.257449	.634242	-331973	.142035	.383058	-008765	.25745	.25745
.410	.05984	.282553	.620972	-331492	.157350	.382669	-010685	.28255	.28255
.450	.07163	.307127	.607724	-330912	.172648	.382201	-012776	.30713	.30713
.530	.09812	.354687	.581307	-329423	.203178	.380996	-017445	.35469	.35469
.610	.12832	.400139	.555029	-327445	.233596	.379393	-022720	.40014	.40014
.690	.16208	.443496	.528930	-324924	.263869	.377346	-028542	.44350	.44350
.770	.19923	.484774	.503057	-321814	.293959	.374814	-034848	.48477	.48477
.850	.23959	.523993	.477457	-318074	.323825	.371760	-041566	.52399	.52399
.930	.28301	.561176	.452182	-313676	.353426	.368154	-048623	.56118	.56118
1.010	.32933	.596352	.427287	-308600	.382715	.363973	-055938	.59635	.59635
1.090	.37838	.629554	.402825	-302834	.411646	.359199	-063426	.62955	.62955
1.170	.43000	.660817	.378852	-296379	.440171	.353823	-071001	.66082	.66082
1.250	.48406	.690184	.355422	-289245	.468241	.347839	-078575	.69018	.69018
1.330	.54038	.717701	.332590	-281453	.495809	.341253	-086057	.71770	.71770

TABLE VII.-  $T_e/T_w = 1.0$ ,  $f_{rr} = 0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
1.410	.59884	.743416	.310406	-.273034	.522826	.334075	-.093360	.74342	.74342
1.490	.65928	.767384	.288920	-.264028	.549246	.326323	-.100398	.76738	.76738
1.570	.72158	.789663	.268176	-.254484	.575023	.318021	-.107089	.78966	.78966
1.650	.78559	.810313	.248216	-.244461	.600115	.309200	-.113355	.81031	.81031
1.730	.85119	.829399	.229074	-.234022	.624482	.299897	-.119125	.82940	.82940
1.810	.91825	.846988	.210781	-.223237	.648087	.290155	-.124336	.84699	.84699
1.890	.98667	.863148	.193363	-.212182	.670896	.280019	-.128933	.86315	.86315
1.970	1.05632	.877950	.176837	-.200933	.692881	.269543	-.132871	.87795	.87795
2.050	1.12710	.891466	.161217	-.189568	.714015	.258779	-.136113	.89147	.89147
2.130	1.19892	.903769	.146507	-.178168	.734279	.247784	-.138634	.90377	.90377
2.210	1.27168	.914931	.132709	-.166809	.753656	.236617	-.140420	.91493	.91493
2.290	1.34528	.925026	.119815	-.155565	.772135	.225336	-.141466	.92503	.92503
2.370	1.41965	.934125	.107813	-.144508	.789709	.214002	-.141777	.93413	.93413
2.450	1.49472	.942300	.096687	-.133703	.806375	.202671	-.141370	.94230	.94230
2.530	1.57040	.949618	.086413	-.123210	.822138	.191401	-.140269	.94962	.94962
2.610	1.64663	.956148	.076964	-.113081	.837003	.180246	-.138506	.95615	.95615
2.690	1.72336	.961953	.068309	-.103362	.850981	.169257	-.136122	.96195	.96195
2.770	1.80053	.967097	.060414	-.094092	.864089	.158481	-.133164	.96710	.96710
2.850	1.87808	.971639	.053241	-.085300	.876345	.147964	-.129682	.97164	.97164
2.930	1.95598	.975634	.046752	-.077010	.887772	.137745	-.125732	.97563	.97563
3.010	2.03417	.979136	.040906	-.069237	.898393	.127858	-.121373	.97914	.97914
3.090	2.11263	.982195	.035660	-.061989	.908239	.118334	-.116665	.98220	.98220
3.170	2.19131	.984857	.030974	-.055268	.917337	.109199	-.111669	.98486	.98486
3.250	2.27019	.987165	.026804	-.049068	.925721	.100474	-.106444	.98716	.98716
3.330	2.34925	.989158	.023109	-.043381	.933424	.092173	-.101051	.98916	.98916
3.410	2.42845	.990874	.019849	-.038192	.940481	.084308	-.095545	.99087	.99087
3.490	2.50778	.992345	.016986	-.033482	.946926	.076887	-.089981	.99234	.99234
3.570	2.58722	.993601	.014480	-.029228	.952794	.069912	-.084409	.99360	.99360
3.650	2.66675	.994670	.012298	-.025407	.958123	.063381	-.078876	.99467	.99467
3.810	2.82604	.996341	.008769	-.018956	.967301	.051630	-.068090	.99634	.99634
3.970	2.98556	.997525	.006158	-.013905	.974734	.041560	-.057904	.99752	.99752
4.130	3.14523	.998349	.004258	-.010028	.980684	.033058	-.048522	.99835	.99835
4.290	3.30502	.998916	.002898	-.007108	.985389	.025984	-.040076	.99892	.99892
4.450	3.46487	.999299	.001942	-.004953	.989066	.020182	-.032632	.99930	.99930
4.610	3.62478	.999554	.001281	-.003393	.991905	.015489	-.026200	.99955	.99955
4.770	3.78473	.999720	.000831	-.002284	.994072	.011746	-.020746	.99972	.99972

TABLE VII.-  $T_e/T_w = 1.0$ ,  $f_w = 0$ ,  $\text{Eu} = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
4.930	3.94469	.999828	.000531	-.001511	.995706	.008802	-.016204	.99983	.99983
5.090	4.10467	.999896	.000334	-.000983	.996924	.006518	-.012485	.99990	.99990
5.250	4.26466	.999939	.000207	-.000628	.997821	.004769	-.009491	.99994	.99994
5.410	4.42465	.999965	.000126	-.000394	.998473	.003448	-.007119	.99996	.99996
5.570	4.58464	.999981	.000075	-.000243	.998942	.002463	-.005269	.99998	.99998
5.730	4.74464	.999990	.000045	-.000147	.999275	.001738	-.003849	.99999	.99999
5.890	4.90464	.999996	.000026	-.000088	.999509	.001212	-.002775	1.00000	1.00000
6.050	5.06464	.999999	.000015	-.000051	.999671	.000836	-.001975	1.00000	1.00000
6.210	5.22464	1.000001	.000009	-.000029	.999782	.000569	-.001387	1.00000	1.00000
6.370	5.38464	1.000002	.000005	-.000016	.999858	.000383	-.000962	1.00000	1.00000
6.530	5.54464	1.000003	.000003	-.000009	.999908	.000254	-.000658	1.00000	1.00000
6.690	5.70464	1.000003	.000002	-.000005	.999941	.000167	-.000445	1.00000	1.00000
6.850	5.86464	1.000003	.000001	-.000003	.999963	.000108	-.000297	1.00000	1.00000
7.010	6.02464	1.000003	.000001	-.000001	.999977	.000069	-.000195	1.00000	1.00000
7.170	6.18464	1.000004	.000001	-.000001	.999986	.000044	-.000127	1.00000	1.00000
7.330	6.34464	1.000004	.000001	-.000000	.999992	.000027	-.000081	1.00000	1.00000
7.490	6.50464	1.000004	.000001	-.000000	.999995	.000017	-.000052	1.00000	1.00000
7.650	6.66465	1.000004	.000001	-.000000	.999997	.000010	-.000032	1.00000	1.00000
7.810	6.82465	1.000004	.000001	-.000000	.999999	.000006	-.000020	1.00000	1.00000
7.970	6.98465	1.000004	.000001	-.000000	.000000	.000004	-.000012	1.00000	1.00000
8.130	7.14465	1.000004	.000001	-.000000	.000000	.000002	-.000007	1.00000	1.00000

TABLE VIII.-  $T_e/T_w = 1.0$ ,  $f_w = -0.5$ ,  $Eu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
.000	-50000	.000000	.574513	-141829	.000000	.241982	.056462	.000000	.000000
.005	-49999	.002871	.573803	-142066	.001211	.242264	.056528	.00287	.00287
.010	-49997	.005738	.573092	-142303	.002423	.242547	.056591	.00574	.00574
.015	-49994	.008602	.572380	-142540	.003636	.242830	.056653	.00860	.00860
.020	-49989	.011462	.571667	-142778	.004851	.243114	.056714	.01146	.01146
.025	-49982	.014318	.570952	-143016	.006067	.243398	.056772	.01432	.01432
.030	-49974	.017171	.570237	-143254	.007285	.243682	.056830	.01717	.01717
.040	-49954	.022867	.568802	-143732	.009725	.244250	.056940	.02287	.02287
.050	-49928	.028547	.567362	-144211	.012170	.244820	.057043	.02855	.02855
.060	-49897	.034214	.565918	-144692	.014621	.245391	.057140	.03421	.03421
.070	-49860	.039866	.564468	-145174	.017078	.245963	.057231	.03987	.03987
.080	-49817	.045503	.563014	-145657	.019540	.246536	.057315	.04550	.04550
.090	-49769	.051126	.561555	-146142	.022008	.247109	.057393	.05113	.05113
.110	-49656	.062328	.558623	-147114	.026962	.248259	.057528	.06233	.06233
.130	-49520	.073471	.555671	-148089	.031939	.249410	.057637	.07347	.07347
.150	-49362	.084554	.552699	-149069	.036939	.250564	.057719	.08455	.08455
.170	-49182	.095579	.549708	-150051	.041961	.251719	.057773	.09558	.09558
.190	-48979	.106543	.546697	-151037	.047007	.252875	.057800	.10654	.10654
.210	-48755	.117446	.543666	-152024	.052076	.254031	.057798	.11745	.11745
.250	-48242	.139071	.537546	-154003	.062284	.256341	.057710	.13907	.13907
.290	-47643	.160449	.531346	-155985	.072584	.258646	.057506	.16045	.16045
.330	-46959	.181577	.525067	-157965	.082975	.260940	.057183	.18158	.18158
.370	-46191	.202453	.518709	-159940	.093459	.263219	.056739	.20245	.20245
.410	-45340	.223073	.512272	-161904	.104033	.265478	.056171	.22307	.22307
.450	-44407	.243434	.505757	-163853	.114696	.267711	.055478	.24343	.24343
.530	-42299	.283366	.492494	-167688	.136289	.272082	.053707	.28337	.28337
.610	-39876	.322225	.478930	-171406	.158225	.276290	.051414	.32222	.32222
.690	-37146	.359987	.465074	-174965	.180490	.280294	.048589	.35999	.35999
.770	-34119	.396629	.450941	-178324	.203066	.284050	.045227	.39663	.39663
.850	-30803	.432131	.436548	-181441	.225930	.287516	.041330	.43213	.43213
.930	-27208	.466471	.421918	-184272	.249059	.290649	.036904	.46647	.46647
1.010	-23343	.499632	.407074	-186775	.272424	.293407	.031962	.49963	.49963
1.090	-19217	.531598	.392044	-188909	.295993	.295749	.026523	.53160	.53160
1.170	-14840	.562355	.376859	-190634	.319732	.297638	.020613	.56235	.56235
1.250	-10223	.591892	.361554	-191915	.343602	.299036	.014266	.59189	.59189
1.330	-5373	.620201	.346165	-192716	.367564	.299910	.007520	.62020	.62020

TABLE VIII.-  $T_p/T_w = 1.0$ .  $f_{\perp} = -0.5$ .  $F_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$p_u/p_{ue}$
1.410	-00303	647277	330733	-193010	391573	300230	000424	64728	64728
1.490	04980	673118	315298	-192771	415585	299970	-006971	67312	67312
1.570	10464	697726	299904	-191981	439552	299108	-014606	69773	69773
1.650	16140	721105	284596	-190625	463426	297628	-022417	72111	72111
1.730	21998	743265	269419	-188698	487156	295518	-030338	74326	74326
1.810	28029	764217	254420	-186198	510692	292773	-038295	76422	76422
1.890	34223	783978	239643	-183134	533983	289392	-046218	78398	78398
1.970	40570	802567	225133	-179519	556978	285381	-054030	80257	80257
2.050	47061	820008	210934	-175374	579627	280752	-061658	82001	82001
2.130	53687	836326	197087	-170726	601882	275523	-069029	83633	83633
2.210	60439	851552	183630	-165609	623695	269716	-076073	85155	85155
2.290	67309	865718	170600	-160063	645022	263362	-082724	86572	86572
2.370	74288	878860	158030	-154133	665820	256493	-088920	87886	87886
2.450	81368	891016	145948	-147867	686048	249148	-094606	89102	89102
2.530	88541	902226	134379	-141317	705672	241371	-099733	90223	90223
2.610	95801	912531	123343	-134539	724657	233207	-104260	91253	91253
2.690	1.03140	921975	112857	-127588	742976	224706	-108155	92198	92198
2.770	1.10551	930603	102933	-120521	760603	215919	-111393	93060	93060
2.850	1.18027	938459	093576	-113395	777517	206901	-113960	93846	93846
2.930	1.25564	945590	084790	-106263	793702	197704	-115848	94559	94559
3.010	1.33155	952041	076572	-099179	809146	188383	-117059	95204	95204
3.090	1.40795	957857	068918	-092192	823841	178992	-117605	95786	95786
3.170	1.48479	963083	061818	-085348	837784	169583	-117505	96308	96308
3.250	1.56203	967762	055258	-078688	850976	160208	-116783	96776	96776
3.330	1.63962	971938	049222	-072249	863420	150914	-115473	97194	97194
3.410	1.71753	975651	043691	-066062	875125	141747	-113612	97565	97565
3.490	1.79571	978941	038644	-060154	886104	132749	-111244	97894	97894
3.570	1.87415	981846	034059	-054546	896371	123960	-108416	98185	98185
3.650	1.95280	984402	029909	-049254	905944	115414	-105177	98440	98440
3.730	2.03164	986643	026169	-044290	914844	107141	-101581	98664	98664
3.810	2.11065	988600	022813	-039658	923095	099169	-097679	98860	98860
3.890	2.18981	990302	019815	-035361	930720	091519	-093525	99030	99030
3.970	2.26910	991779	017147	-031397	937747	084210	-089171	99178	99178
4.050	2.34849	993054	014783	-027759	944203	077256	-084670	99305	99305
4.210	2.50755	995092	010865	-021426	955519	064447	-075415	99509	99509
4.370	2.66689	996579	007865	-016260	964905	053126	-066118	99658	99658

TABLE VIII.-  $T_e/T_w = 1.0$ ,  $f_w = -0.5$ ,  $E_u = 1/3$  - Concluded

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$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
4.530	2.82643	.997648	.005607	-.012131	.972598	.043275	-.057080	.99765	.99765
4.690	2.98612	.998405	.003936	-.008898	.978828	.034834	-.048542	.99840	.99840
4.850	3.14591	.998932	.002720	-.006415	.983814	.027707	-.040677	.99893	.99893
5.010	3.30577	.999293	.001850	-.004547	.987757	.021777	-.033595	.99929	.99929
5.170	3.46568	.999538	.001238	-.003168	.990839	.016913	-.027354	.99954	.99954
5.330	3.62562	.999700	.000815	-.002170	.993219	.012980	-.021961	.99970	.99970
5.490	3.78558	.999806	.000528	-.001461	.995035	.009843	-.017388	.99981	.99981
5.650	3.94555	.999874	.000336	-.000966	.996404	.007375	-.013580	.99987	.99987
5.810	4.10554	.999917	.000209	-.000628	.997424	.005461	-.010462	.99992	.99992
5.970	4.26553	.999944	.000128	-.000402	.998175	.003995	-.007953	.99994	.99994
6.130	4.42552	.999960	.000076	-.000252	.998722	.002888	-.005965	.99996	.99996
6.290	4.58551	.999969	.000044	-.000155	.999115	.002063	-.004415	.99997	.99997
6.450	4.74551	.999975	.000024	-.000094	.999394	.001456	-.003225	.99997	.99997
6.610	4.90550	.999978	.000013	-.000056	.999590	.001016	-.002325	.99998	.99998
6.770	5.06550	.999979	.000006	-.000033	.999725	.000700	-.001654	.99998	.99998
6.930	5.22550	.999980	.000001	-.000019	.999819	.000476	-.001162	.99998	.99998
7.090	5.38549	.999980	-.000001	-.000011	.999882	.000320	-.0000805	.99998	.99998
7.250	5.54549	.999979	-.000002	-.000006	.999924	.000213	-.000551	.99998	.99998
7.410	5.70549	.999979	-.000003	-.000003	.999952	.000140	-.000372	.99998	.99998
7.570	5.86548	.999978	-.000003	-.000002	.999970	.000091	-.000248	.99998	.99998
7.730	6.02548	.999978	-.000003	-.000001	.999982	.000058	-.000163	.99998	.99998
7.890	6.18548	.999977	-.000004	-.000000	.999989	.000037	-.000106	.99998	.99998
8.050	6.34547	.999977	-.000004	-.000000	.999994	.000023	-.000068	.99998	.99998
8.210	6.50547	.999976	-.000004	-.000000	.999997	.000014	-.000043	.99998	.99998
8.370	6.66547	.999976	-.000004	-.000000	.999999	.000009	-.000027	.99998	.99998
8.530	6.82546	.999975	-.000004	-.000000	1.000000	.000005	-.000017	.99998	.99998
8.690	6.98546	.999974	-.000004	-.000000	1.000000	.000003	-.000010	.99997	.99997
9.010	7.30545	.999973	-.000004	-.000000	1.000001	.000001	-.000004	.99997	.99997

TABLE IX.-  $T_e/T_w = 1$ ,  $f_w = -1.0$ ,  $Bu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
.000	1.00000	.000000	.428720	-.047520	.000000	.131417	.061328	.00000	.00000
.005	-.99999	.002143	.428482	-.047679	.000658	.131724	.061471	.00214	.00214
.010	-.99998	.004285	.428243	-.047838	.001317	.132032	.061613	.00428	.00428
.015	-.99995	.006425	.428004	-.047998	.001978	.132340	.061756	.00643	.00643
.020	-.99991	.008565	.427763	-.048158	.002641	.132649	.061898	.00856	.00856
.025	-.99987	.010703	.427522	-.048319	.003305	.132959	.062039	.01070	.01070
.030	-.99981	.012840	.427280	-.048480	.003970	.133270	.062181	.01284	.01284
.040	-.99966	.017110	.426794	-.048804	.005306	.133893	.062462	.01711	.01711
.050	-.99947	.021376	.426304	-.049130	.006648	.134519	.062742	.02138	.02138
.060	-.99923	.025637	.425811	-.049459	.007996	.135148	.063020	.02564	.02564
.070	-.99895	.029892	.425315	-.049789	.009351	.135779	.063297	.02989	.02989
.080	-.99863	.034143	.424815	-.050122	.010712	.136414	.063573	.03414	.03414
.090	-.99827	.038388	.424312	-.050457	.012079	.137051	.063846	.03839	.03839
.110	-.99742	.046865	.423296	-.051133	.014833	.138333	.064389	.04686	.04686
.130	-.99640	.055320	.422267	-.051817	.017613	.139626	.064924	.05532	.05532
.150	-.99520	.063755	.421224	-.052509	.020418	.140930	.065452	.06376	.06376
.170	-.99385	.072169	.420167	-.053210	.023250	.142244	.065972	.07217	.07217
.190	-.99232	.080562	.419095	-.053920	.026108	.143569	.066484	.08056	.08056
.210	-.99062	.088933	.418010	-.054637	.028993	.144904	.066988	.08893	.08893
.250	-.98673	.105609	.415795	-.056097	.034843	.147603	.067967	.10561	.10561
.290	-.98218	.122196	.413522	-.057589	.040802	.150340	.068908	.12220	.12220
.330	-.97696	.138690	.411188	-.059113	.046871	.153115	.069807	.13869	.13869
.370	-.97108	.155090	.408792	-.060669	.053051	.155924	.070660	.15509	.15509
.410	-.96455	.171393	.406334	-.062255	.059345	.158767	.071465	.17139	.17139
.450	-.95737	.187596	.403811	-.063871	.065753	.161641	.072217	.18760	.18760
.530	-.94108	.219693	.398570	-.067189	.078917	.167473	.073549	.21969	.21969
.610	-.92223	.251360	.393058	-.070612	.092551	.173402	.074628	.25136	.25136
.690	-.90087	.282575	.387269	-.074131	.106663	.179406	.075423	.28257	.28257
.770	-.87703	.313315	.381195	-.077731	.121258	.185461	.075906	.31332	.31332
.850	-.85075	.343558	.374830	-.081397	.136338	.191542	.076046	.34356	.34356
.930	-.82208	.373280	.368170	-.085111	.151904	.197619	.075814	.37328	.37328
1.090	-.75770	.431066	.353954	-.092600	.184488	.209637	.074126	.43107	.43107
1.250	-.68426	.486482	.338543	-.100011	.218966	.221244	.070648	.48648	.48648
1.410	-.60216	.539338	.321967	-.107121	.255248	.232141	.065233	.53934	.53934
1.570	-.51182	.589452	.304293	-.113686	.293196	.242011	.057804	.58945	.58945
1.730	-.41369	.636659	.285630	-.119447	.332619	.250531	.048367	.63666	.63666

TABLE IX.-  $T_e/T_w = 1$ ,  $f_w = -1.0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
1.890	-30825	.680809	.266127	-.124143	.373277	.257387	.037025	.68081	.68081
2.050	-.19600	.721785	.245973	-.127535	.414878	.262290	.023991	.72178	.72178
2.210	-.07746	.759499	.225396	-.129415	.457092	.264992	.009578	.75950	.75950
2.370	.04686	.793903	.204649	-.129633	.499548	.265304	-.005802	.79390	.79390
2.530	.17642	.824992	.184006	-.128104	.541855	.263110	-.021661	.82499	.82499
2.690	.31068	.852806	.163748	-.124823	.583608	.258376	-.037461	.85281	.85281
2.850	.44914	.877428	.144151	-.119870	.624403	.251156	-.052642	.87743	.87743
3.010	.59130	.898984	.125470	-.113403	.663853	.241592	-.066665	.89898	.89898
3.170	.73667	.917639	.107930	-.105652	.701600	.229911	-.079038	.91764	.91764
3.330	.88480	.933592	.091714	-.096901	.737329	.216409	-.089356	.93359	.93359
3.490	1.03528	.947066	.076958	-.087471	.770774	.201441	-.097323	.94707	.94707
3.650	1.18774	.958301	.063742	-.077693	.801734	.185399	-.102763	.95830	.95830
3.810	1.34183	.967547	.052098	-.067889	.830067	.168693	-.105633	.96755	.96755
3.970	1.49726	.975054	.042004	-.058351	.855702	.151728	-.106016	.97505	.97505
4.130	1.65377	.981067	.033399	-.049326	.878628	.134889	-.104102	.98107	.98107
4.290	1.81114	.985815	.026184	-.041004	.898892	.118521	-.100174	.98582	.98582
4.450	1.96918	.989512	.020234	-.033518	.916596	.102921	-.094579	.98951	.98951
4.610	2.12774	.992350	.015410	-.026940	.931881	.088324	-.087701	.99235	.99235
4.770	2.28669	.994495	.011565	-.021290	.944922	.074904	-.079932	.99450	.99450
4.930	2.44594	.996094	.008551	-.016541	.955918	.062773	-.071652	.99609	.99609
5.090	2.60542	.997268	.006227	-.012635	.965080	.051985	-.063206	.99727	.99727
5.250	2.76505	.998117	.004467	-.009489	.972624	.042541	-.054893	.99812	.99812
5.410	2.92480	.998721	.003156	-.007005	.978762	.034400	-.046953	.99872	.99872
5.570	3.08463	.999145	.002196	-.005084	.983697	.027487	-.039568	.99915	.99915
5.730	3.24452	.999438	.001504	-.003628	.987618	.021703	-.032861	.99944	.99944
5.890	3.40445	.999638	.001015	-.002544	.990696	.016933	-.026902	.99964	.99964
6.050	3.56440	.999771	.000674	-.001754	.993083	.013054	-.021714	.99977	.99977
6.210	3.72437	.999859	.000441	-.001189	.994914	.009945	-.017284	.99986	.99986
6.370	3.88436	.999917	.000284	-.000792	.996300	.007486	-.013570	.99992	.99992
6.530	4.04435	.999953	.000181	-.000518	.997338	.005568	-.010509	.99995	.99995
6.690	4.20434	.999976	.000113	-.000333	.998105	.004092	-.008029	.99998	.99998
6.850	4.36434	.999991	.000070	-.000211	.998666	.002972	-.006053	.99999	.99999
7.010	4.52434	1.000000	.000043	-.000131	.999072	.002133	-.004503	1.00000	1.00000
7.170	4.68434	1.000005	.000027	-.000080	.999361	.001512	-.003306	1.00001	1.00001
7.330	4.84434	1.000009	.000017	-.000048	.999564	.001059	-.002395	1.00001	1.00001
7.490	5.00434	1.000011	.000011	-.000028	.999707	.000733	-.001713	1.00001	1.00001

TABLE IX.-  $T_e/T_w = 1$ ,  $f_w = -1.0$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
7.650	5.16434	1.000012	.000007	-.000016	.999804	.000502	-.001209	1.00001	1.00001
7.810	5.32434	1.000013	.000005	-.000009	.999871	.000339	-.000842	1.00001	1.00001
7.970	5.48435	1.000014	.000004	-.000005	.999916	.000226	-.000579	1.00001	1.00001
8.130	5.64435	1.000015	.000003	-.000003	.999945	.000149	-.000393	1.00001	1.00001
8.290	5.80435	1.000015	.000003	-.000001	.999965	.000097	-.000264	1.00002	1.00002
8.450	5.96435	1.000016	.000003	-.000001	.999977	.000063	-.000174	1.00002	1.00002
8.610	6.12436	1.000016	.000003	-.000000	.999985	.000040	-.000114	1.00002	1.00002
8.770	6.28436	1.000016	.000003	-.000000	.999991	.000025	-.000073	1.00002	1.00002
8.930	6.44436	1.000017	.000003	-.000000	.999994	.000016	-.000047	1.00002	1.00002
9.090	6.60436	1.000017	.000003	-.000000	.999996	.000010	-.000029	1.00002	1.00002
9.250	6.76437	1.000018	.000003	-.000000	.999997	.000006	-.000018	1.00002	1.00002
9.410	6.92437	1.000018	.000003	-.000000	.999998	.000003	-.000011	1.00002	1.00002
9.730	7.24437	1.000019	.000003	-.000000	.999998	.000001	-.000004	1.00002	1.00002

TABLE X.-  $T_e/T_w = 2$ ,  $f_w = 0$ ,  $Eu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/peu_e$
.000	.00000	.000000	.589198	-.759448	.000000	.372623	-.118021	.00000	.00000
.005	.00001	.002937	.585417	-.753034	.001862	.372034	-.117431	.00294	.00587
.010	.00003	.005854	.581668	-.746696	.003720	.371448	-.116848	.00588	.01171
.015	.00007	.008753	.577950	-.740434	.005576	.370866	-.116273	.00880	.01751
.020	.00012	.011634	.574263	-.734245	.007429	.370286	-.115705	.01172	.02327
.025	.00018	.014496	.570608	-.728129	.009279	.369709	-.115145	.01463	.02899
.030	.00026	.017340	.566982	-.722085	.011126	.369134	-.114591	.01753	.03468
.040	.00046	.022974	.559821	-.710207	.014812	.367994	-.113505	.02331	.04595
.050	.00072	.028537	.552777	-.698603	.018486	.366864	-.112446	.02906	.05707
.060	.00103	.034030	.545848	-.687263	.022149	.365745	-.111414	.03478	.06806
.070	.00140	.039454	.539031	-.676181	.025801	.364636	-.110407	.04047	.07891
.080	.00182	.044811	.532323	-.665348	.029442	.363537	-.109426	.04613	.08962
.090	.00230	.050101	.525723	-.654757	.033072	.362447	-.108468	.05176	.10020
.110	.00340	.060486	.512834	-.634271	.040299	.360296	-.106625	.06292	.12097
.130	.00472	.070617	.500346	-.614669	.047484	.358182	-.104871	.07397	.14123
.150	.00623	.080502	.488242	-.595902	.054627	.356101	-.103203	.08490	.16100
.170	.00793	.090149	.476505	-.577920	.061728	.354053	-.101616	.09571	.18030
.190	.00983	.099565	.465120	-.560682	.068789	.352036	-.100106	.10641	.19913
.210	.01191	.108756	.454073	-.544147	.075810	.350048	-.098669	.11700	.21751
.250	.01662	.126492	.432938	-.513033	.089733	.346156	-.096001	.13784	.25298
.290	.02202	.143407	.412999	-.484306	.103503	.342365	-.093584	.15825	.28681
.330	.02808	.159547	.394165	-.457725	.117124	.338666	-.091395	.17823	.31909
.370	.03478	.174954	.376355	-.433080	.130598	.335050	-.089412	.19780	.34991
.410	.04207	.189668	.359495	-.410188	.143929	.331510	-.087617	.21697	.37934
.450	.04994	.203725	.343519	-.388884	.157120	.328039	-.085991	.23573	.40745
.490	.05836	.217160	.328365	-.369025	.170173	.324629	-.084520	.25412	.43432
.530	.06731	.230005	.313979	-.350482	.183091	.321275	-.083189	.27212	.46001
.570	.07675	.242288	.300310	-.333141	.195875	.317972	-.081985	.28975	.48458
.610	.08668	.254039	.287313	-.316901	.208529	.314715	-.080897	.30701	.50808
.650	.09707	.265282	.274945	-.301670	.221053	.311499	-.079914	.32392	.53056
.690	.10790	.276042	.263167	-.287366	.233450	.308321	-.079026	.34048	.55208
.730	.11915	.286342	.251944	-.273917	.245719	.305176	-.078226	.35670	.57268
.770	.13080	.296205	.241243	-.261255	.257864	.302062	-.077503	.37258	.59241
.810	.14284	.305648	.231034	-.249321	.269885	.298975	-.076852	.38814	.61130
.890	.16801	.323357	.211981	-.227425	.293558	.292873	-.075737	.41828	.64671
.970	.19454	.339610	.194584	-.207852	.316746	.286851	-.074833	.44718	.67922

TABLE X.-  $T_e/T_w = 2$ ,  $f_w = 0$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
1.050	.22231	.354530	.178671	-.190290	.339456	.280895	-.074099	.47488	.70906
1.130	.25123	.368232	.164091	-.174479	.361691	.274992	-.073501	.50142	.73646
1.210	.28120	.380817	.150713	-.160200	.383456	.269132	-.073009	.52684	.76163
1.290	.31213	.392376	.138423	-.147267	.404753	.263308	-.072599	.55119	.78475
1.370	.34395	.402991	.127119	-.135523	.425586	.257514	-.072249	.57450	.80598
1.450	.37659	.412739	.116711	-.124833	.445956	.251747	-.071940	.59680	.82548
1.530	.40997	.421687	.107120	-.115080	.465866	.246003	-.071658	.61814	.84337
1.610	.44404	.429898	.098276	-.106164	.485317	.240281	-.071388	.63853	.85980
1.690	.47874	.437429	.090114	-.097998	.504311	.234581	-.071120	.65803	.87486
1.770	.51401	.444333	.082578	-.090507	.522851	.228902	-.070844	.67665	.88867
1.850	.54981	.450657	.075617	-.083622	.540936	.223246	-.070551	.69443	.90131
1.930	.58610	.456446	.069184	-.077286	.558571	.217615	-.070235	.71140	.91289
2.010	.62283	.461739	.063238	-.071447	.575755	.212009	-.069891	.72759	.92348
2.090	.65997	.466576	.057740	-.066059	.592493	.206433	-.069512	.74302	.93315
2.170	.69747	.470989	.052657	-.061081	.608786	.200888	-.069097	.75772	.94198
2.250	.73531	.475011	.047957	-.056478	.624636	.195379	-.068641	.77172	.95002
2.330	.77346	.478672	.043612	-.052217	.640047	.189907	-.068143	.78504	.95734
2.410	.81189	.481998	.039594	-.048269	.655022	.184477	-.067601	.79772	.96400
2.570	.88949	.487746	.032450	-.041211	.683678	.173756	-.066381	.82121	.97549
2.730	.96792	.492438	.026355	-.035126	.710635	.163245	-.064978	.84238	.98488
2.890	1.04702	.496228	.021166	-.029868	.735929	.152972	-.063396	.86142	.99246
3.050	1.12667	.499252	.016759	-.025317	.759601	.142967	-.061642	.87848	.99850
3.210	1.20675	.501627	.013031	-.021374	.781694	.133255	-.059729	.89375	1.00325
3.370	1.28716	.503454	.009891	-.017957	.802259	.123862	-.057671	.90735	1.00691
3.530	1.36783	.504820	.007261	-.014995	.821348	.114807	-.055486	.91945	1.00964
3.690	1.44868	.505801	.005072	-.012430	.839017	.106112	-.053191	.93018	1.01160
3.850	1.52967	.506463	.003265	-.010212	.855324	.097791	-.050806	.93965	1.01293
4.010	1.61073	.506863	.001788	-.008297	.870331	.089858	-.048350	.94800	1.01373
4.170	1.69185	.507051	.000595	-.006650	.884100	.082322	-.045845	.95533	1.01410
4.330	1.77298	.507067	-.000353	-.005238	.896695	.075189	-.043308	.96175	1.01413
4.490	1.85410	.506949	-.001092	-.004033	.908182	.068464	-.040760	.96735	1.01390
4.650	1.93520	.506727	-.001654	-.003011	.918625	.062146	-.038218	.97222	1.01345
4.810	2.01625	.506428	-.002064	-.002149	.928090	.056233	-.035699	.97644	1.01286
4.970	2.09725	.506073	-.002349	-.001430	.936641	.050720	-.033220	.98008	1.01215
5.130	2.17819	.505682	-.002529	-.000834	.944342	.045600	-.030795	.98322	1.01136

TABLE X.-  $T_e/T_w = 2$ ,  $f_w = 0$ ,  $E_u = 1/3$  - Concluded

F

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
5.290	2.25907	.505269	-.002622	-.000348	.951253	.040862	-.028438	.98591	1.01054
5.450	2.33988	.504846	-.002645	.000042	.957437	.036495	-.026160	.98821	1.00969
5.610	2.42062	.504425	-.002613	.000350	.962951	.032486	-.023970	.99016	1.00885
5.770	2.50130	.504013	-.002537	.000587	.967851	.028820	-.021878	.99182	1.00803
5.930	2.58191	.503615	-.002428	.000762	.972191	.025480	-.019890	.99323	1.00723
6.250	2.74294	.502881	-.002147	.000965	.979390	.019711	-.016244	.99540	1.00576
6.570	2.90376	.502245	-.001825	.001022	.984922	.015035	-.013056	.99692	1.00449
6.890	3.06439	.501713	-.001502	.000984	.989113	.011307	-.010325	.99796	1.00343
7.210	3.22487	.501281	-.001202	.000889	.992243	.008381	-.008033	.99867	1.00256
7.530	3.38522	.500940	-.000937	.000766	.994547	.006123	-.006149	.99915	1.00188
7.850	3.54548	.500678	-.000713	.000634	.996219	.004408	-.004629	.99946	1.00136
8.170	3.70566	.500480	-.000531	.000509	.997414	.003126	-.003429	.99967	1.00096
8.490	3.86579	.500334	-.000387	.000396	.998256	.002185	-.002498	.99980	1.00067
8.810	4.02588	.500229	-.000276	.000300	.998841	.001504	-.001790	.99988	1.00046
9.130	4.18594	.500154	-.000193	.000222	.999240	.001020	-.001262	.99993	1.00031
9.450	4.34598	.500103	-.000133	.000160	.999509	.000681	-.000875	.99996	1.00021
9.770	4.50601	.500068	-.000089	.000113	.999688	.000448	-.000597	.99998	1.00014
10.090	4.66603	.500044	-.000059	.000078	.999804	.000290	-.000400	.99999	1.00009
10.410	4.82604	.500029	-.000038	.000053	.999879	.000185	-.000264	1.00000	1.00006
10.730	4.98604	.500019	-.000024	.000035	.999927	.000116	-.000171	1.00000	1.00004
11.050	5.14605	.500013	-.000015	.000023	.999957	.000072	-.000109	1.00000	1.00003
11.370	5.30605	.500009	-.000009	.000015	.999975	.000044	-.000069	1.00001	1.00002
11.690	5.46606	.500006	-.000006	.000009	.999986	.000026	-.000042	1.00001	1.00001
12.010	5.62606	.500005	-.000003	.000006	.999993	.000016	-.000026	1.00001	1.00001
12.330	5.78606	.500004	-.000002	.000003	.999996	.000009	-.000015	1.00001	1.00001
12.650	5.94606	.500004	-.000001	.000002	.999999	.000005	-.000009	1.00001	1.00001
12.970	6.10606	.500004	-.000000	.000001	1.000000	.000003	-.000005	1.00001	1.00001

TABLE XI.-  $T_e/T_w = 2$ ,  $f_w = -0.5$ ,  $Eu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
.000	- .50000	.000000	.401790	- .268963	.000000	.217754	.010505	.00000	.00000
.005	- .49999	.002006	.400447	- .268158	.001089	.217807	.010505	.00201	.00401
.010	- .49998	.004004	.399108	- .267355	.002178	.217859	.010503	.00401	.00801
.015	- .49995	.005997	.397774	- .266556	.003267	.217912	.010501	.00602	.01199
.020	- .49992	.007982	.396443	- .265760	.004357	.217964	.010498	.00802	.01596
.025	- .49988	.009961	.395116	- .264967	.005447	.218017	.010493	.01002	.01992
.030	- .49982	.011933	.393793	- .264176	.006537	.218069	.010488	.01201	.02387
.040	- .49968	.015858	.391159	- .262605	.008719	.218174	.010474	.01600	.03172
.050	- .49950	.019757	.388541	- .261044	.010901	.218278	.010456	.01997	.03951
.060	- .49929	.023629	.385938	- .259496	.013084	.218383	.010435	.02394	.04726
.070	- .49903	.027475	.383351	- .257959	.015268	.218487	.010409	.02789	.05495
.080	- .49874	.031296	.380779	- .256432	.017454	.218591	.010380	.03184	.06259
.090	- .49840	.035091	.378222	- .254917	.019640	.218695	.010347	.03578	.07018
.110	- .49763	.042605	.373154	- .251918	.024016	.218901	.010270	.04363	.08521
.130	- .49670	.050018	.368145	- .248961	.028396	.219105	.010178	.05144	.10004
.150	- .49563	.057331	.363195	- .246045	.032780	.219308	.010072	.05921	.11466
.170	- .49441	.064546	.358303	- .243167	.037169	.219508	.009952	.06694	.12909
.190	- .49305	.071663	.353468	- .240328	.041561	.219706	.009818	.07464	.14333
.210	- .49154	.078685	.348690	- .237525	.045957	.219901	.009671	.08230	.15737
.250	- .48812	.092444	.339299	- .232026	.054761	.220281	.009339	.09751	.18489
.290	- .48415	.105832	.330126	- .226663	.063579	.220647	.008956	.11256	.21166
.330	- .47966	.118857	.321165	- .221429	.072412	.220997	.008527	.12746	.23771
.370	- .47465	.131528	.312410	- .216316	.081259	.221329	.008052	.14222	.26306
.410	- .46914	.143852	.303858	- .211320	.090118	.221641	.007534	.15682	.28770
.450	- .46314	.155839	.295503	- .206436	.098990	.221931	.006975	.17127	.31168
.530	- .44975	.178829	.279369	- .196982	.116765	.222441	.005744	.19971	.35766
.610	- .43457	.200558	.263975	- .187923	.134577	.222846	.004375	.22755	.40112
.690	- .41769	.221084	.249291	- .179232	.152418	.223137	.002883	.25478	.44217
.770	- .39922	.240463	.235289	- .170886	.170276	.223305	.001283	.28141	.48093
.850	- .37925	.258748	.221941	- .162868	.188143	.223340	- .000409	.30743	.51750
.930	- .35785	.275990	.209222	- .155161	.206007	.223237	- .002179	.33285	.55198
1.010	- .33512	.292239	.197107	- .147753	.223857	.222990	- .004015	.35766	.58448
1.170	- .28593	.321946	.174599	- .133789	.259468	.222044	- .007830	.40548	.64389
1.330	- .23228	.348225	.154238	- .120900	.294878	.220478	- .011758	.45091	.69645
1.490	- .17467	.371407	.135857	- .109025	.329987	.218280	- .015711	.49397	.74281
1.650	- .11357	.391797	.119299	- .098105	.364694	.215453	- .019612	.53468	.78359

TABLE XI.-  $T_e/T_w = 2$ ,  $f_w = -0.5$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
1.810	-0.04943	.409672	.104415	-.088088	.398900	.212011	-.023393	.57309	.81934
1.970	.01740	.425291	.091065	-.078922	.432506	.207977	-.026998	.60923	.85058
2.130	.08656	.438888	.079117	-.070553	.465422	.203384	-.030377	.64316	.87778
2.290	.15775	.450677	.068448	-.062929	.497561	.198270	-.033493	.67492	.90135
2.450	.23069	.460854	.058943	-.056000	.528844	.192681	-.036316	.70457	.92171
2.610	.30514	.469595	.050494	-.049713	.559197	.186666	-.038823	.73219	.93919
2.770	.38089	.477063	.043003	-.044019	.588557	.180276	-.040999	.75784	.95413
2.930	.45774	.483402	.036379	-.038872	.616868	.173564	-.042837	.78160	.96680
3.090	.53553	.488746	.030537	-.034226	.644083	.166586	-.044333	.80354	.97749
3.250	.61410	.493212	.025402	-.030038	.670164	.159395	-.045491	.82375	.98642
3.410	.69331	.496909	.020903	-.026269	.695081	.152046	-.046318	.84230	.99382
3.570	.77307	.499932	.016975	-.022883	.718813	.144591	-.046824	.85929	.99986
3.730	.85326	.502368	.013562	-.019844	.741347	.137079	-.047023	.87480	1.00474
3.890	.93380	.504296	.010608	-.017122	.762678	.129559	-.046932	.88891	1.00859
4.050	1.01461	.505785	.008067	-.014688	.782808	.122075	-.046569	.90172	1.01157
4.210	1.09563	.506897	.005894	-.012517	.801746	.114670	-.045956	.91330	1.01379
4.370	1.17680	.507689	.004049	-.010584	.819509	.107382	-.045112	.92374	1.01538
4.530	1.25808	.508208	.002496	-.008868	.836116	.100245	-.044062	.93313	1.01642
4.690	1.33942	.508501	.001201	-.007349	.851597	.093292	-.042827	.94154	1.01700
4.850	1.42079	.508605	.000135	-.006010	.865981	.086549	-.041431	.94905	1.01721
5.010	1.50216	.508555	-.000731	-.004834	.879305	.080041	-.039897	.95573	1.01711
5.170	1.58352	.508381	-.001420	-.003806	.891608	.073788	-.038249	.96166	1.01676
5.330	1.66484	.508109	-.001956	-.002913	.902932	.067806	-.036507	.96690	1.01622
5.490	1.74611	.507762	-.002359	-.002142	.913321	.062110	-.034694	.97151	1.01552
5.650	1.82732	.507360	-.002647	-.001481	.922822	.056707	-.032831	.97556	1.01472
5.810	1.90846	.506920	-.002838	-.000921	.931483	.051605	-.030936	.97911	1.01384
5.970	1.98953	.506456	-.002947	-.000450	.939352	.046808	-.029029	.98220	1.01291
6.130	2.07053	.505981	-.002986	-.000060	.946478	.042316	-.027126	.98488	1.01196
6.290	2.15145	.505504	-.002970	-.000259	.952909	.038127	-.025243	.98720	1.01101
6.450	2.23229	.505033	-.002907	-.000513	.958694	.034236	-.023393	.98921	1.01007
6.610	2.31306	.504575	-.002808	-.000711	.963881	.030638	-.021590	.99093	1.00915
6.770	2.39375	.504136	-.002682	-.000860	.968514	.027324	-.019844	.99240	1.00827
6.930	2.47438	.503718	-.002536	-.000965	.972639	.024285	-.018163	.99365	1.00744
7.250	2.63545	.502958	-.002206	-.001072	.979535	.018983	-.015031	.99562	1.00592
7.570	2.79629	.502308	-.001860	-.001074	.984889	.014630	-.012234	.99702	1.00462

TABLE XI.-  $T_e/T_w = 2$  ,  $f_w = -0.5$ ,  $\text{Eu} = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$p_u/p_e u_e$
7.890	2.95694	.501766	-0.001526	.001006	.988987	.011115	-0.009795	.99801	1.00353
8.210	3.11743	.501328	-0.001221	.000897	.992079	.008323	-0.007713	.99868	1.00266
8.530	3.27780	.500981	-0.000954	.000769	.994378	.006143	-0.005974	.99915	1.00196
8.850	3.43806	.500713	-0.000730	.000637	.996064	.004467	-0.004550	.99945	1.00143
9.170	3.59826	.500510	-0.000546	.000512	.997281	.003201	-0.003409	.99966	1.00102
9.490	3.75840	.500359	-0.000401	.000401	.998147	.002260	-0.002512	.99979	1.00072
9.810	3.91849	.500250	-0.000288	.000306	.998754	.001571	-0.001820	.99988	1.00050
10.130	4.07856	.500172	-0.000203	.000228	.999173	.001076	-0.001298	.99993	1.00034
10.450	4.23861	.500118	-0.000141	.000166	.999459	.000726	-0.000910	.99996	1.00024
10.770	4.39864	.500080	-0.000095	.000119	.999650	.000483	-0.000627	.99999	1.00016
11.090	4.55866	.500055	-0.000063	.000083	.999776	.000316	-0.000426	1.00000	1.00011
11.410	4.71867	.500039	-0.000041	.000057	.999858	.000204	-0.000284	1.00001	1.00008
11.730	4.87868	.500028	-0.000026	.000038	.999911	.000129	-0.000186	1.00001	1.00006
12.050	5.03869	.500021	-0.000016	.000025	.999944	.000081	-0.000120	1.00001	1.00004
12.370	5.19870	.500017	-0.000010	.000016	.999964	.000050	-0.000076	1.00002	1.00003
12.690	5.35870	.500015	-0.000006	.000010	.999977	.000030	-0.000048	1.00002	1.00003
13.010	5.51871	.500013	-0.000003	.000006	.999985	.000018	-0.000029	1.00002	1.00003
13.330	5.67871	.500013	-0.000001	.000004	.999989	.000011	-0.000018	1.00002	1.00003
13.650	5.83872	.500012	-0.000000	.000002	.999992	.000006	-0.000010	1.00002	1.00002
13.970	5.99872	.500012	0.000000	.000001	.999993	.000003	-0.000006	1.00002	1.00002

TABLE XII.-  $T_e/T_w = 2$ ,  $f_w = -1.0$ ,  $E_u = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
.000	-1.00000	.000000	.262042	-.064013	.000000	.101823	.038705	.00000	.00000
.005	-1.00000	.001309	.261722	-.064128	.000510	.102017	.038750	.00131	.00262
.010	-.99999	.002617	.261401	-.064243	.001020	.102210	.038795	.00262	.00523
.015	-.99997	.003923	.261079	-.064357	.001532	.102405	.038839	.00393	.00785
.020	-.99995	.005228	.260757	-.064471	.002044	.102599	.038883	.00524	.01046
.025	-.99992	.006531	.260435	-.064585	.002558	.102793	.038927	.00655	.01306
.030	-.99988	.007832	.260111	-.064698	.003072	.102988	.038970	.00786	.01566
.040	-.99979	.010430	.259463	-.064925	.004104	.103378	.039056	.01047	.02086
.050	-.99967	.013022	.258813	-.065151	.005140	.103769	.039140	.01309	.02604
.060	-.99953	.015606	.258160	-.065375	.006179	.104161	.039223	.01570	.03121
.070	-.99936	.018185	.257505	-.065598	.007223	.104554	.039304	.01832	.03637
.080	-.99917	.020757	.256848	-.065821	.008270	.104947	.039384	.02093	.04151
.090	-.99895	.023322	.256189	-.066042	.009322	.105341	.039463	.02354	.04664
.110	-.99843	.028432	.254864	-.066481	.011437	.106132	.039615	.02876	.05686
.130	-.99781	.033516	.253530	-.066915	.013567	.106926	.039760	.03397	.06703
.150	-.99709	.038573	.252187	-.067344	.015714	.107723	.039900	.03918	.07715
.170	-.99627	.043604	.250836	-.067768	.017876	.108522	.040033	.04438	.08721
.190	-.99534	.048607	.249476	-.068186	.020055	.109324	.040160	.04958	.09721
.210	-.99432	.053583	.248109	-.068599	.022249	.110128	.040280	.05477	.10717
.250	-.99198	.063452	.245348	-.069407	.026687	.111744	.040500	.06515	.12690
.290	-.98925	.073210	.242556	-.070189	.031189	.113368	.040692	.07549	.14642
.330	-.98613	.082856	.239734	-.070944	.035756	.114999	.040856	.08582	.16571
.370	-.98262	.092388	.236881	-.071671	.040389	.116636	.040990	.09612	.18478
.410	-.97874	.101806	.234000	-.072368	.045087	.118278	.041095	.10640	.20361
.450	-.97448	.111108	.231092	-.073033	.049851	.119923	.041169	.11665	.22222
.530	-.96486	.129360	.225199	-.074263	.059577	.123220	.041223	.13707	.25872
.610	-.95379	.147138	.219214	-.075351	.069566	.126515	.041147	.15737	.29428
.690	-.94133	.164432	.213147	-.076288	.079819	.129800	.040939	.17756	.32886
.770	-.92750	.181239	.207012	-.077066	.090333	.133062	.040595	.19761	.36248
.850	-.91234	.197553	.200821	-.077678	.101108	.136291	.040114	.21753	.39511
.930	-.89590	.213370	.194588	-.078121	.112139	.139476	.039495	.23730	.42674
1.090	-.85933	.243501	.182050	-.078487	.134954	.145671	.037842	.27636	.48700
1.250	-.81809	.271625	.169509	-.078161	.158737	.151557	.035650	.31474	.54325
1.410	-.77251	.297750	.157075	-.077163	.183432	.157051	.032946	.35237	.59550
1.570	-.72291	.321901	.144851	-.075537	.208968	.162075	.029772	.38917	.64380
1.730	-.66961	.344119	.132933	-.073348	.235266	.166556	.026183	.42508	.68824

TABLE XII.-  $T_e/T_w = 2$ ,  $f_w = -1.0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
1.890	- .61290	.364460	.121405	- .070669	.262234	.170435	.022241	.46003	.72892
2.050	- .55308	.382993	.110340	- .067587	.289771	.173659	.018018	.49397	.76599
2.210	- .49043	.399797	.099795	- .064187	.317768	.176189	.013587	.52684	.79959
2.370	- .42523	.414957	.089813	- .060556	.346113	.177999	.009024	.55858	.82991
2.530	- .35773	.428568	.080425	- .056776	.374689	.179074	.004403	.58915	.85714
2.690	- .28816	.440726	.071648	- .052921	.403377	.179409	- .000204	.61850	.88145
2.850	- .21677	.451529	.063491	- .049056	.432060	.179012	- .004733	.64662	.90306
3.010	- .14374	.461075	.055948	- .045236	.460623	.177902	- .009125	.67346	.92215
3.170	- .06928	.469464	.049010	- .041506	.488952	.176103	- .013326	.69901	.93893
3.330	.00643	.476790	.042660	- .037903	.516941	.173650	- .017292	.72326	.95358
3.490	.08324	.483145	.036873	- .034454	.544488	.170583	- .020988	.74621	.96629
3.650	.16099	.488618	.031625	- .031176	.571498	.166950	- .024383	.76786	.97724
3.810	.23955	.493292	.026887	- .028084	.597884	.162798	- .027456	.78822	.98658
3.970	.31881	.497247	.022628	- .025185	.623568	.158182	- .030191	.80732	.99449
4.130	.39864	.500557	.018818	- .022479	.648480	.153155	- .032580	.82516	1.00111
4.290	.47895	.503291	.015425	- .019967	.672559	.147775	- .034619	.84178	1.00658
4.450	.55966	.505514	.012418	- .017645	.695752	.142096	- .036311	.85723	1.01103
4.610	.64069	.507284	.009768	- .015507	.718017	.136173	- .037660	.87152	1.01457
4.770	.72197	.508657	.007446	- .013545	.739318	.130062	- .038678	.88472	1.01731
4.930	.80344	.509683	.005425	- .011752	.759629	.123814	- .039376	.89685	1.01937
5.090	.88506	.510408	.003677	- .010119	.778933	.117478	- .039771	.90798	1.02082
5.250	.96676	.510873	.002179	- .008636	.797220	.111102	- .039880	.91815	1.02175
5.410	1.04852	.511117	.000906	- .007296	.814486	.104731	- .039723	.92741	1.02223
5.570	1.13031	.511174	- .000163	- .006089	.830736	.098404	- .039320	.93582	1.02235
5.730	1.21209	.511075	- .001049	- .005006	.845980	.092160	- .038694	.94343	1.02215
5.890	1.29385	.510847	- .001771	- .004040	.860234	.086032	- .037868	.95029	1.02169
6.050	1.37556	.510516	- .002348	- .003182	.873518	.080052	- .036862	.95646	1.02103
6.210	1.45721	.510103	- .002795	- .002425	.885859	.074245	- .035701	.96198	1.02021
6.370	1.53879	.509627	- .003129	- .001761	.897287	.068635	- .034407	.96691	1.01925
6.530	1.62028	.509107	- .003363	- .001183	.907834	.063240	- .033002	.97129	1.01821
6.690	1.70170	.508556	- .003511	- .000685	.917536	.058079	- .031507	.97517	1.01711
6.850	1.78302	.507987	- .003586	- .000259	.926432	.053162	- .029943	.97860	1.01597
7.010	1.86425	.507411	- .003598	- .000099	.934562	.048499	- .028330	.98162	1.01482
7.170	1.94539	.506838	- .003558	- .000397	.941966	.044098	- .026685	.98426	1.01368
7.330	2.02644	.506275	- .003474	- .000639	.948687	.039961	- .025027	.98657	1.01255
7.490	2.10740	.505729	- .003356	- .000832	.954767	.036089	- .023370	.98858	1.01146

TABLE XII.-  $T_e/T_w = 2$ ,  $f_w = -1.0$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
7.650	2.18828	.505203	- .003210	.000980	.960250	.032482	- .021730	.99032	1.01041
7.810	2.26907	.504702	- .003044	.001089	.965175	.029134	- .020119	.99183	1.00940
7.970	2.34978	.504230	- .002864	.001163	.969586	.026041	- .018549	.99312	1.00846
8.130	2.43042	.503786	- .002674	.001206	.973522	.023196	- .017029	.99423	1.00757
8.450	2.59150	.502993	- .002283	.001220	.980122	.018211	- .014173	.99599	1.00599
8.770	2.75235	.502324	- .001901	.001160	.985269	.014095	- .011599	.99725	1.00465
9.090	2.91300	.501774	- .001546	.001053	.989226	.010755	- .009335	.99814	1.00355
9.410	3.07350	.501331	- .001229	.000921	.992223	.008088	- .007388	.99876	1.00266
9.730	3.23387	.500982	- .000957	.000779	.994462	.005994	- .005751	.99919	1.00196
10.050	3.39414	.500714	- .000730	.000641	.996110	.004377	- .004402	.99948	1.00143
10.370	3.55433	.500511	- .000546	.000513	.997305	.003149	- .003313	.99967	1.00102
10.690	3.71447	.500360	- .000401	.000400	.998159	.002233	- .002453	.99980	1.00072
11.010	3.87456	.500251	- .000289	.000305	.998760	.001559	- .001786	.99988	1.00050
11.330	4.03463	.500173	- .000204	.000228	.999177	.001073	- .001279	.99993	1.00035
11.650	4.19468	.500118	- .000141	.000166	.999461	.000727	- .000901	.99997	1.00024
11.970	4.35471	.500080	- .000096	.000119	.999653	.000485	- .000624	.99999	1.00016
12.290	4.51473	.500055	- .000064	.000083	.999780	.000319	- .000425	1.00000	1.00011
12.610	4.67475	.500038	- .000042	.000057	.999863	.000206	- .000285	1.00001	1.00008
12.930	4.83476	.500027	- .000027	.000038	.999916	.000132	- .000188	1.00001	1.00005
13.250	4.99476	.500021	- .000017	.000025	.999950	.000083	- .000122	1.00002	1.00004
13.570	5.15477	.500016	- .000010	.000016	.999971	.000051	- .000078	1.00002	1.00003
13.890	5.31477	.500014	- .000006	.000010	.999984	.000031	- .000049	1.00002	1.00003
14.210	5.47478	.500012	- .000003	.000007	.999992	.000019	- .000030	1.00002	1.00002
14.530	5.63478	.500012	- .000002	.000004	.999997	.000011	- .000018	1.00002	1.00002
14.850	5.79479	.500011	- .000000	.000002	1.000000	.000006	- .000011	1.00002	1.00002
15.170	5.95479	.500011	- .000000	.000001	1.000001	.000004	- .000006	1.00002	1.00002

TABLE XIII.-  $T_e/T_w = 4.0$ ,  $f_w = 0$ ,  $E_u = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
.000	.00000	.00000	.487475	-1.532746	.00000	.367075	-343597	.00000	.00000
.005	.00001	.002418	.479907	-1.494653	.001831	.365370	-338553	.00243	.00967
.010	.00002	.004799	.472526	-1.457879	.003654	.363689	-333635	.00485	.01920
.015	.00005	.007144	.465326	-1.422367	.005468	.362033	-328838	.00726	.02858
.020	.00010	.009453	.458301	-1.388062	.007274	.360401	-324158	.00966	.03781
.025	.00015	.011727	.451444	-1.354911	.009072	.358791	-319592	.01205	.04691
.030	.00021	.013968	.444750	-1.322865	.010862	.357205	-315134	.01442	.05587
.040	.00037	.018350	.431829	-1.261900	.014418	.354097	-306534	.01914	.07340
.050	.00058	.022606	.419499	-1.204820	.017944	.351073	-298329	.02382	.09042
.060	.00083	.026742	.407721	-1.151311	.021440	.348129	-290496	.02846	.10697
.070	.00111	.030762	.396462	-1.101089	.024907	.345262	-283011	.03306	.12305
.080	.00144	.034673	.385689	-1.053900	.028346	.342467	-275853	.03762	.13869
.090	.00181	.038478	.375374	-1.009511	.031757	.339743	-269003	.04214	.15391
.110	.00265	.045789	.356012	-928308	.038499	.334494	-256154	.05108	.18316
.130	.00364	.052728	.338183	-856012	.045138	.329490	-244335	.05987	.21091
.150	.00476	.059325	.321720	-791400	.051680	.324714	-233436	.06852	.23730
.170	.00601	.065605	.306482	-733450	.058128	.320147	-223358	.07705	.26242
.190	.00738	.071592	.292343	-681301	.064487	.315775	-214020	.08544	.28637
.210	.00887	.077306	.279196	-634224	.070760	.311582	-205348	.09372	.30922
.230	.01047	.082766	.266945	-591600	.076951	.307557	-197278	.10187	.33106
.250	.01218	.087989	.255506	-552900	.083064	.303687	-189753	.10991	.35196
.270	.01399	.092991	.244805	-517669	.089100	.299963	-182724	.11785	.37196
.290	.01590	.097786	.234778	-485515	.095063	.296375	-176147	.12567	.39114
.310	.01790	.102386	.225367	-456101	.100956	.292915	-169982	.13340	.40954
.330	.01999	.106804	.216518	-429131	.106780	.289574	-164195	.14102	.42722
.350	.02217	.111050	.208187	-404349	.112539	.286345	-158755	.14854	.44420
.370	.02443	.115135	.200331	-381532	.118235	.283221	-153633	.15597	.46054
.390	.02677	.119066	.192914	-360482	.123869	.280197	-148804	.16331	.47627
.410	.02919	.122854	.185901	-341027	.129443	.277267	-144245	.17056	.49142
.430	.03169	.126505	.179263	-323013	.134960	.274426	-139937	.17772	.50602
.450	.03425	.130027	.172972	-306306	.140421	.271668	-135860	.18480	.52011
.470	.03689	.133426	.167003	-290786	.145827	.268990	-131998	.19180	.53370
.490	.03959	.136709	.161333	-276345	.151181	.266387	-128336	.19871	.54684
.530	.04518	.142948	.150812	-250332	.161736	.261392	-121555	.21231	.57179
.570	.05102	.148787	.141263	-227619	.172096	.256654	-115421	.22560	.59515
.610	.05708	.154261	.132565	-207685	.182271	.252150	-109851	.23861	.61704

TABLE XIII.-  $T_e/T_w = 4.0$ ,  $f_w = 0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
.650	.06336	.159402	.124616	-.190104	.192271	.247859	-.104776	.25135	.63761
.690	.06983	.164239	.117330	-.174530	.202103	.243762	-.100139	.26382	.65696
.730	.07649	.168796	.110631	-.160676	.211774	.239843	-.095888	.27604	.67519
.770	.08333	.173096	.104456	-.148304	.221292	.236087	-.091981	.28801	.69239
.810	.09034	.177159	.098749	-.137214	.230663	.232480	-.088381	.29975	.70864
.850	.09750	.181002	.093464	-.127241	.239892	.229013	-.085056	.31126	.72401
.890	.10481	.184641	.088557	-.118242	.248986	.225673	-.081977	.32256	.73856
.930	.11227	.188091	.083993	-.110099	.257948	.222451	-.079121	.33364	.75236
.970	.11986	.191365	.079739	-.102708	.266783	.219340	-.076465	.34452	.76546
1.010	.12757	.194474	.075767	-.095982	.275496	.216332	-.073992	.35520	.77790
1.050	.13541	.197430	.072053	-.089846	.284091	.213419	-.071684	.36569	.78972
1.090	.14337	.200241	.068573	-.084234	.292571	.210595	-.069526	.37600	.80097
1.130	.15143	.202918	.065308	-.079091	.300940	.207855	-.067505	.38612	.81167
1.170	.15960	.205469	.062240	-.074366	.309201	.205193	-.065609	.39606	.82187
1.210	.16787	.207900	.059353	-.070016	.317356	.202605	-.063829	.40583	.83160
1.290	.18468	.212433	.054069	-.062298	.333364	.197631	-.060576	.42488	.84973
1.370	.20185	.216566	.049356	-.055685	.348984	.192903	-.057681	.44330	.86626
1.450	.21932	.220343	.045135	-.049981	.364234	.188394	-.055092	.46111	.88137
1.530	.23709	.223799	.041339	-.045031	.379132	.184081	-.052764	.47835	.89520
1.610	.25512	.226967	.037913	-.040711	.393692	.179946	-.050662	.49503	.90787
1.690	.27340	.229874	.034811	-.036922	.407928	.175970	-.048756	.51119	.91950
1.770	.29190	.232544	.031994	-.033582	.421851	.172140	-.047021	.52684	.93018
1.850	.31060	.235000	.029428	-.030625	.435474	.168443	-.045434	.54201	.94000
1.930	.32949	.237259	.027085	-.027996	.448805	.164867	-.043978	.55671	.94904
2.010	.34856	.239339	.024941	-.025651	.461855	.161403	-.042637	.57096	.95735
2.090	.36778	.241254	.022974	-.023550	.474633	.158042	-.041398	.58478	.96502
2.170	.38715	.243019	.021167	-.021662	.487145	.154777	-.040250	.59817	.97207
2.250	.40666	.244645	.019503	-.019961	.499399	.151600	-.039181	.61117	.97858
2.330	.42629	.246143	.017969	-.018423	.511403	.148506	-.038184	.62378	.98457
2.410	.44604	.247523	.016552	-.017029	.523162	.145489	-.037251	.63601	.99009
2.490	.46589	.248794	.015241	-.015762	.534683	.142544	-.036376	.64787	.99518
2.650	.50589	.251040	.012901	-.013554	.557032	.136855	-.034773	.67055	1.00416
2.810	.54621	.252939	.010884	-.011705	.578490	.131408	-.033338	.69191	1.01176
2.970	.58681	.254538	.009140	-.010144	.599094	.126180	-.032038	.71201	1.01815
3.130	.62765	.255876	.007626	-.008817	.618878	.121150	-.030851	.73094	1.02351
3.290	.66868	.256989	.006308	-.007681	.637872	.116302	-.029756	.74877	1.02795

TABLE XIII.-  $T_e/T_w = 4.0$ ,  $f_w = 0$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
3.450	.70987	.257904	.005159	-.006704	.656104	.111624	-.028738	.76554	1.03162
3.610	.75120	.258648	.004156	-.005858	.673600	.107103	-.027783	.78132	1.03459
3.770	.79263	.259241	.003279	-.005123	.690384	.102730	-.026883	.79617	1.03696
3.930	.83415	.259703	.002511	-.004481	.706481	.098498	-.026027	.81013	1.03881
4.090	.87573	.260050	.001840	-.003918	.721911	.094399	-.025210	.82325	1.04020
4.250	.91736	.260296	.001254	-.003423	.736696	.090429	-.024425	.83557	1.04118
4.410	.95902	.260455	.000742	-.002987	.750855	.086582	-.023668	.84715	1.04182
4.570	1.00070	.260537	.000296	-.002600	.764408	.082854	-.022935	.85801	1.04215
4.730	1.04239	.260553	-.000092	-.002257	.777374	.079242	-.022223	.86819	1.04221
5.050	1.12575	.260418	-.000719	-.001681	.801618	.072351	-.020853	.88668	1.04167
5.370	1.20904	.260110	-.001181	-.001223	.823725	.065890	-.019541	.90289	1.04044
5.690	1.29221	.259676	-.001511	-.000857	.843831	.059840	-.018278	.91704	1.03870
6.010	1.37522	.259154	-.001737	-.000564	.862065	.054188	-.017058	.92938	1.03662
6.330	1.45806	.258574	-.001879	-.000330	.878552	.048919	-.015878	.94008	1.03429
6.650	1.54070	.257959	-.001953	-.000144	.893413	.044021	-.014737	.94935	1.03184
6.970	1.62315	.257329	-.001975	-.000004	.906764	.039483	-.013634	.95734	1.02932
7.290	1.70540	.256700	-.001955	.000119	.918719	.035291	-.012572	.96420	1.02680
7.610	1.78744	.256082	-.001902	.000206	.929386	.031433	-.011551	.97008	1.02433
7.930	1.86929	.255485	-.001825	.000272	.938870	.027894	-.010573	.97509	1.02194
8.250	1.95095	.254916	-.001730	.000319	.947271	.024661	-.009639	.97934	1.01966
8.570	2.03244	.254379	-.001622	.000350	.954684	.021720	-.008753	.98293	1.01752
8.890	2.11376	.253878	-.001507	.000369	.961201	.019054	-.007915	.98596	1.01551
9.210	2.19493	.253415	-.001388	.000376	.966907	.016649	-.007126	.98850	1.01366
9.530	2.27595	.252991	-.001267	.000375	.971882	.014488	-.006387	.99062	1.01196
10.170	2.43762	.252255	-.001033	.000354	.979940	.010835	-.005063	.99384	1.00902
10.810	2.59887	.251664	-.000818	.000315	.985917	.007966	-.003938	.99602	1.00666
11.450	2.75978	.251202	-.000631	.000269	.990276	.005755	-.003004	.99748	1.00481
12.090	2.92043	.250850	-.000474	.000221	.993398	.004084	-.002247	.99843	1.00340
12.730	3.08088	.250589	-.000348	.000176	.995595	.002845	-.001647	.99905	1.00236
13.370	3.24120	.250400	-.000249	.000135	.997112	.001946	-.001183	.99943	1.00160
14.010	3.40141	.250266	-.000174	.000101	.998141	.001307	-.000833	.99967	1.00106
14.650	3.56155	.250174	-.000118	.000073	.998827	.000861	-.000574	.99981	1.00070
15.290	3.72164	.250111	-.000079	.000052	.999274	.000557	-.000387	.99990	1.00045
15.930	3.88169	.250070	-.000051	.000035	.999561	.000353	-.000256	.99995	1.00028
16.570	4.04173	.250044	-.000033	.000024	.999742	.000219	-.000166	.99998	1.00017
17.210	4.20175	.250027	-.000020	.000016	.999853	.000134	-.000105	1.00000	1.00011

TABLE XIII.-  $T_e/T_w = 4.0$ ,  $f_w = 0$ ,  $Eu = 1/3$  - Concluded

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$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
17.850	4.36177	.250017	-.000012	.000010	.999920	.000080	-.000065	1.00001	1.00007
18.490	4.52177	.250010	-.000007	.000006	.999960	.000047	-.000040	1.00001	1.00004
19.130	4.68178	.250007	-.000004	.000004	.999983	.000027	-.000024	1.00001	1.00003
19.770	4.84178	.250005	-.000002	.000002	.999997	.000015	-.000014	1.00002	1.00002
20.410	5.00179	.250004	-.000001	.000001	1.000004	.000008	-.000008	1.00002	1.00001

TABLE XIV.-  $T_e/T_w = 4.0$ ,  $f_w = -0.5$ ,  $\text{Eu} = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$p_u/p_{ue}$
.000	- .50000	.000000	.296164	- .458506	.000000	.197544	- .053417	.00000	.00000
.005	- .50000	.001475	.293885	- .453220	.000987	.197278	- .053008	.00148	.00590
.010	- .49999	.002939	.291632	- .448019	.001973	.197014	- .052605	.00296	.01176
.015	- .49997	.004391	.289404	- .442902	.002957	.196752	- .052207	.00443	.01757
.020	- .49994	.005833	.287202	- .437868	.003940	.196492	- .051814	.00590	.02333
.025	- .49991	.007264	.285026	- .432914	.004922	.196234	- .051427	.00737	.02905
.030	- .49987	.008683	.282873	- .428039	.005903	.195978	- .051045	.00884	.03473
.040	- .49977	.011491	.278641	- .418519	.007860	.195471	- .050295	.01176	.04596
.050	- .49964	.014256	.274502	- .409295	.009812	.194972	- .049565	.01468	.05703
.060	- .49948	.016981	.270454	- .400356	.011759	.194480	- .048854	.01758	.06792
.070	- .49930	.019666	.266494	- .391690	.013702	.193994	- .048161	.02047	.07866
.080	- .49909	.022311	.262619	- .383286	.015639	.193516	- .047486	.02336	.08925
.090	- .49885	.024918	.258827	- .375134	.017572	.193045	- .046828	.02623	.09967
.110	- .49830	.030021	.251482	- .359549	.021424	.192121	- .045561	.03195	.12008
.130	- .49765	.034980	.244439	- .344860	.025257	.191222	- .044356	.03763	.13992
.150	- .49691	.039800	.237682	- .331002	.029073	.190346	- .043210	.04327	.15920
.170	- .49606	.044489	.231194	- .317916	.032871	.189493	- .042119	.04888	.17796
.190	- .49513	.049050	.224961	- .305544	.036653	.188661	- .041079	.05444	.19620
.210	- .49410	.053489	.218968	- .293839	.040418	.187850	- .040089	.05997	.21396
.250	- .49179	.062018	.207654	- .272245	.047900	.186283	- .038244	.07093	.24807
.290	- .48915	.070112	.197160	- .252811	.055321	.184788	- .036564	.08175	.28045
.330	- .48619	.077801	.187404	- .235262	.062684	.183356	- .035031	.09243	.31120
.370	- .48293	.085113	.178316	- .219368	.069991	.181984	- .033631	.10298	.34045
.410	- .47938	.092074	.169835	- .204930	.077243	.180664	- .032350	.11341	.36830
.450	- .47557	.098707	.161905	- .191780	.084444	.179394	- .031177	.12371	.39483
.490	- .47149	.105034	.154477	- .179772	.091595	.178169	- .030101	.13390	.42013
.530	- .46717	.111072	.147510	- .168779	.098698	.176985	- .029113	.14396	.44429
.570	- .46261	.116840	.140963	- .158693	.105755	.175839	- .028206	.15391	.46736
.610	- .45782	.122354	.134803	- .149420	.112766	.174727	- .027372	.16375	.48942
.650	- .45282	.127629	.129000	- .140874	.119733	.173648	- .026605	.17347	.51052
.690	- .44762	.132678	.123524	- .132985	.126658	.172598	- .025898	.18309	.53071
.730	- .44221	.137515	.118353	- .125688	.133542	.171575	- .025248	.19261	.55006
.770	- .43662	.142150	.113462	- .118926	.140385	.170578	- .024648	.20202	.56860
.810	- .43084	.146595	.108832	- .112649	.147188	.169603	- .024096	.21133	.58638
.890	- .41877	.154954	.100282	- .101380	.160680	.167716	- .023117	.22965	.61982
.970	- .40607	.162663	.092572	- .091582	.174025	.165900	- .022285	.24758	.65065

TABLE XIV.-  $T_e/T_w = 4.0$ ,  $f_w = -0.5$ ,  $\text{Eu} = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
1.050	-39276	169785	085596	-083013	187226	164147	-021578	26515	67914
1.130	-37891	176375	079262	-075483	200289	162445	-020978	28235	70550
1.210	-36456	182482	073495	-068834	213218	160788	-020469	29921	72993
1.290	-34973	188148	068229	-062937	226016	159168	-020039	31572	75259
1.370	-33446	193411	063408	-057686	238686	157580	-019677	33190	77364
1.450	-31879	198304	058984	-052993	251230	156018	-019374	34776	79322
1.530	-30274	202858	054916	-048784	263650	154479	-019121	36331	81143
1.610	-28634	207099	051167	-044997	275947	152957	-018912	37854	82840
1.690	-26962	211052	047707	-041579	288123	151452	-018741	39348	84421
1.770	-25258	214739	044506	-038486	300180	149958	-018602	40812	85896
1.850	-23526	218180	041541	-035680	312117	148474	-018492	42247	87272
1.930	-21768	221392	038790	-033127	323936	146999	-018405	43654	88557
2.010	-19985	224391	036235	-030799	335637	145529	-018340	45033	89757
2.090	-18178	227194	033857	-028671	347220	144064	-018292	46385	90878
2.170	-16350	229813	031643	-026723	358687	142602	-018259	47711	91925
2.330	-12634	234549	027649	-023293	381270	139683	-018230	50283	93820
2.490	-08848	238688	024161	-020384	403386	136767	-018235	52754	95475
2.650	-04999	242303	021104	-017902	425035	133847	-018265	55127	96921
2.810	-01097	245460	018414	-015770	446217	130921	-018307	57405	98184
2.970	02853	248213	016041	-013930	466929	127988	-018355	59591	99285
3.130	06844	250608	013943	-012335	487172	125048	-018403	61688	1.00243
3.290	10871	252688	012083	-010944	506944	122100	-018446	63698	1.01075
3.450	14929	254486	010432	-009727	526244	119145	-018480	65625	1.01794
3.610	19013	256036	008963	-008658	545071	116187	-018501	67471	1.02414
3.770	23121	257363	007654	-007715	563424	113226	-018509	69238	1.02945
3.930	27248	258493	006488	-006882	581303	110265	-018501	70928	1.03397
4.090	31392	259446	005447	-006142	598708	107306	-018476	72544	1.03778
4.250	35549	260242	004518	-005484	615641	104353	-018433	74089	1.04097
4.410	39719	260897	003688	-004897	632102	101409	-018371	75564	1.04359
4.570	43897	261427	002948	-004372	648092	98476	-018290	76971	1.04571
4.730	48084	261844	002286	-003901	663615	95557	-018190	78314	1.04738
5.050	56472	262391	001171	-003098	693266	089775	-017934	80811	1.04956
5.370	64873	262619	000288	-002445	721081	084087	-017604	83073	1.05047
5.690	73277	262595	-000406	-001911	747094	078516	-017205	85114	1.05038
6.010	81677	262375	-000946	-001472	771346	073082	-016742	86952	1.04950
6.330	90068	262004	-001357	-001110	793884	067807	-016220	88601	1.04801

TABLE XIV.-  $T_e/T_w = 4.0$ ,  $f_w = -0.5$ ,  $\text{Eu} = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
6.650	.98444	.261518	-.001663	-.000810	.814761	.062707	-.015647	.90074	1.04607
6.970	1.06804	.260949	-.001881	-.000562	.834036	.057798	-.015029	.91387	1.04380
7.290	1.15144	.260322	-.002027	-.000357	.851773	.053092	-.014373	.92553	1.04129
7.610	1.23464	.259658	-.002113	-.000188	.868038	.048602	-.013686	.93584	1.03863
7.930	1.31762	.258975	-.002150	-.000049	.882902	.044336	-.012976	.94492	1.03590
8.250	1.40038	.258286	-.002148	.000063	.896438	.040299	-.012249	.95290	1.03315
8.570	1.48293	.257604	-.002112	.000154	.908719	.036497	-.011513	.95987	1.03042
8.890	1.56525	.256937	-.002051	.000225	.919821	.032932	-.010773	.96595	1.02775
9.210	1.64737	.256294	-.001970	.000280	.929820	.029602	-.010036	.97121	1.02517
9.530	1.72928	.255678	-.001873	.000321	.938792	.026508	-.009308	.97576	1.02271
9.850	1.81101	.255096	-.001766	.000350	.946810	.023644	-.008593	.97968	1.02038
10.170	1.89255	.254549	-.001651	.000368	.953948	.021006	-.007897	.98303	1.01820
10.490	1.97392	.254040	-.001531	.000377	.960277	.018588	-.007223	.98589	1.01616
10.810	2.05514	.253569	-.001410	.000379	.965867	.016381	-.006577	.98831	1.01428
11.130	2.13621	.253138	-.001290	.000374	.970782	.014376	-.005959	.99036	1.01255
11.450	2.21715	.252744	-.001171	.000364	.975088	.012563	-.005374	.99209	1.01098
11.770	2.29797	.252387	-.001057	.000350	.978842	.010933	-.004823	.99353	1.00955
12.090	2.37868	.252067	-.000948	.000332	.982103	.009473	-.004307	.99473	1.00827
12.730	2.53983	.251526	-.000748	.000291	.987348	.007019	-.003385	.99656	1.00610
13.370	2.70066	.251103	-.000576	.000246	.991202	.005109	-.002607	.99779	1.00441
14.010	2.86126	.250782	-.000433	.000201	.993984	.003653	-.001968	.99860	1.00313
14.650	3.02168	.250543	-.000318	.000159	.995956	.002564	-.001455	.99913	1.00217
15.290	3.18197	.250370	-.000228	.000123	.997328	.001767	-.001054	.99947	1.00148
15.930	3.34216	.250247	-.000160	.000092	.998265	.001195	-.000748	.99968	1.00099
16.570	3.50229	.250161	-.000110	.000067	.998893	.000793	-.000520	.99982	1.00065
17.210	3.66238	.250103	-.000074	.000047	.999307	.000516	-.000354	.99989	1.00041
17.850	3.82243	.250065	-.000048	.000033	.999574	.000330	-.000236	.99994	1.00026
18.490	3.98246	.250040	-.000031	.000022	.999743	.000207	-.000154	.99997	1.00016
19.130	4.14248	.250024	-.000019	.000014	.999848	.000127	-.000098	.99998	1.00010
19.770	4.30249	.250014	-.000012	.000009	.999912	.000076	-.000061	.99999	1.00006
20.410	4.46250	.250008	-.000007	.000006	.999950	.000045	-.000038	1.00000	1.00003
21.050	4.62251	.250005	-.000004	.000004	.999973	.000026	-.000023	1.00000	1.00002
21.690	4.78251	.250003	-.000002	.000002	.999985	.000015	-.000013	1.00000	1.00001
22.330	4.94251	.250001	-.000001	.000001	.999993	.000008	-.000008	1.00000	1.00001

TABLE XV.-  $T_e/T_w = 4.0$ ,  $f_w = -1.0$ ,  $E_u = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
.000	-1.00000	.000000	.161451	-.075616	.000000	.076403	.020769	.00000	.00000
.005	-1.00000	.000806	.161073	-.075535	.000382	.076507	.020767	.00081	.00323
.010	-.99999	.001611	.160696	-.075455	.000765	.076611	.020765	.00161	.00644
.015	-.99998	.002413	.160319	-.075374	.001148	.076714	.020763	.00242	.00965
.020	-.99997	.003214	.159942	-.075293	.001532	.076818	.020760	.00323	.01286
.025	-.99995	.004013	.159566	-.075211	.001917	.076922	.020757	.00404	.01605
.030	-.99993	.004810	.159190	-.075129	.002301	.077026	.020755	.00484	.01924
.040	-.99987	.006398	.158439	-.074964	.003073	.077233	.020748	.00646	.02559
.050	-.99980	.007978	.157691	-.074798	.003846	.077441	.020741	.00807	.03191
.060	-.99971	.009552	.156943	-.074630	.004622	.077648	.020733	.00968	.03821
.070	-.99961	.011117	.156198	-.074461	.005399	.077856	.020725	.01130	.04447
.080	-.99949	.012675	.155454	-.074290	.006179	.078063	.020716	.01291	.05070
.090	-.99936	.014226	.154712	-.074118	.006960	.078270	.020706	.01452	.05691
.110	-.99904	.017306	.153233	-.073770	.008530	.078684	.020684	.01775	.06922
.130	-.99866	.020356	.151761	-.073417	.010108	.079097	.020659	.02097	.08142
.150	-.99823	.023376	.150297	-.073059	.011694	.079510	.020631	.02420	.09351
.170	-.99773	.026368	.148839	-.072696	.013288	.079922	.020601	.02742	.10547
.190	-.99717	.029330	.147389	-.072327	.014891	.080334	.020567	.03064	.11732
.210	-.99656	.032263	.145946	-.071954	.016501	.080745	.020531	.03386	.12905
.250	-.99515	.038044	.143083	-.071194	.019748	.081565	.020451	.04030	.15217
.290	-.99351	.043710	.140251	-.070415	.023027	.082381	.020360	.04673	.17484
.330	-.99165	.049264	.137450	-.069620	.026338	.083193	.020258	.05316	.19706
.370	-.98957	.054707	.134681	-.068808	.029682	.084002	.020146	.05958	.21883
.410	-.98728	.060039	.131945	-.067982	.033058	.084805	.020024	.06599	.24016
.450	-.98477	.065263	.129243	-.067142	.036466	.085603	.019891	.07240	.26105
.530	-.97914	.075389	.123940	-.065423	.043378	.087183	.019596	.08520	.30156
.610	-.97272	.085097	.118776	-.063662	.050415	.088738	.019264	.09797	.34039
.690	-.96554	.094397	.113755	-.061865	.057575	.090264	.018896	.11070	.37759
.770	-.95763	.103302	.108879	-.060042	.064856	.091760	.018493	.12340	.41321
.850	-.94902	.111822	.104149	-.058201	.072256	.093222	.018059	.13606	.44729
.930	-.93975	.119969	.099567	-.056349	.079771	.094649	.017595	.14868	.47988
1.090	-.91931	.135195	.090848	-.052642	.095136	.097384	.016585	.17378	.54078
1.250	-.89656	.149072	.082719	-.048974	.110925	.099951	.015482	.19868	.59629
1.410	-.87168	.161696	.075172	-.045390	.127110	.102335	.014302	.22336	.64678
1.570	-.84488	.173157	.068188	-.041927	.143662	.104525	.013062	.24779	.69263
1.730	-.81633	.183545	.061747	-.038613	.160547	.106512	.011777	.27195	.73418

TABLE XV.-  $T_e/T_w = 4.0$ ,  $f_w = -1.0$ ,  $\text{Eu} = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
1.890	-0.78619	0.192944	0.055823	-0.035468	0.177735	0.108292	0.010462	0.29582	0.77177
2.050	-0.75463	0.201434	0.050388	-0.032505	0.195189	0.109859	0.009130	0.31939	0.80574
2.210	-0.72178	0.209092	0.045411	-0.029730	0.212878	0.111213	0.007793	0.34263	0.83637
2.370	-0.68776	0.215989	0.040864	-0.027147	0.230766	0.112353	0.006461	0.36552	0.86395
2.530	-0.65270	0.222190	0.036714	-0.024753	0.248820	0.113281	0.005144	0.38805	0.88876
2.690	-0.61670	0.227757	0.032933	-0.022543	0.267005	0.114000	0.003850	0.41019	0.91103
2.850	-0.57985	0.232746	0.029491	-0.020511	0.285289	0.114515	0.002585	0.43195	0.93099
3.010	-0.54225	0.237211	0.026361	-0.018646	0.303639	0.114830	0.001356	0.45329	0.94884
3.170	-0.50397	0.241197	0.023516	-0.016940	0.322024	0.114951	0.000166	0.47421	0.96479
3.330	-0.46509	0.244750	0.020932	-0.015381	0.340414	0.114885	-0.000980	0.49470	0.97900
3.490	-0.42567	0.247908	0.018586	-0.013960	0.358778	0.114639	-0.002080	0.51474	0.99163
3.650	-0.38577	0.250709	0.016458	-0.012666	0.377089	0.114222	-0.003131	0.53433	1.00284
3.810	-0.34546	0.253185	0.014527	-0.011488	0.395320	0.113640	-0.004131	0.55345	1.01274
3.970	-0.30477	0.255367	0.012776	-0.010418	0.413446	0.112903	-0.005080	0.57211	1.02147
4.130	-0.26376	0.257282	0.011188	-0.009445	0.431441	0.112018	-0.005976	0.59029	1.02913
4.290	-0.22245	0.258955	0.009749	-0.008560	0.449284	0.110993	-0.006820	0.60799	1.03582
4.450	-0.18090	0.260409	0.008445	-0.007757	0.466952	0.109838	-0.007612	0.62520	1.04164
4.610	-0.13913	0.261664	0.007263	-0.007027	0.484425	0.108560	-0.008352	0.64193	1.04666
4.770	-0.09718	0.262739	0.006192	-0.006364	0.501685	0.107168	-0.009040	0.65818	1.05096
4.930	-0.05506	0.263651	0.005223	-0.005760	0.518714	0.105670	-0.009678	0.67393	1.05460
5.250	0.02954	0.265046	0.003553	-0.004713	0.552012	0.102388	-0.010805	0.70397	1.06019
5.570	0.11451	0.265957	0.002188	-0.003844	0.584206	0.098775	-0.011744	0.73208	1.06383
5.890	0.19971	0.266474	0.001077	-0.003122	0.615199	0.094890	-0.012504	0.75828	1.06589
6.210	0.28502	0.266669	0.000177	-0.002520	0.644913	0.090790	-0.013096	0.78261	1.06668
6.530	0.37035	0.266606	-0.000546	-0.002016	0.673287	0.086526	-0.013532	0.80511	1.06643
6.850	0.45563	0.266336	-0.001122	-0.001594	0.700277	0.082145	-0.013825	0.82586	1.06534
7.170	0.54079	0.265902	-0.001574	-0.001240	0.725852	0.077692	-0.013986	0.84492	1.06361
7.490	0.62579	0.265340	-0.001921	-0.000941	0.749996	0.073207	-0.014026	0.86235	1.06136
7.810	0.71060	0.264682	-0.002181	-0.000690	0.772705	0.068727	-0.013957	0.87824	1.05873
8.130	0.79518	0.263952	-0.002367	-0.000477	0.793986	0.064285	-0.013790	0.89268	1.05581
8.450	0.87952	0.263174	-0.002490	-0.000298	0.813855	0.059911	-0.013536	0.90573	1.05269
8.770	0.96361	0.262364	-0.002561	-0.000148	0.832338	0.055630	-0.013206	0.91749	1.04946
9.090	1.04743	0.261539	-0.002588	-0.00022	0.849470	0.051466	-0.012809	0.92805	1.04616
9.410	1.13099	0.260712	-0.002577	-0.00083	0.865291	0.047439	-0.012355	0.93749	1.04285
9.730	1.21429	0.259893	-0.002537	-0.00169	0.879847	0.043564	-0.011853	0.94589	1.03957
10.050	1.29733	0.259091	-0.002471	-0.00239	0.893190	0.039857	-0.011313	0.95335	1.03637

TABLE XV.-  $T_e/T_w = 4.0$ ,  $f_w = -1.0$ ,  $\epsilon_u = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho e u_e$
10.370	1.38011	.258314	-.002385	.000295	.905374	.036327	-.010743	.95993	1.03326
10.690	1.46265	.257567	-.002283	.000339	.916459	.032983	-.010151	.96571	1.03027
11.010	1.54496	.256854	-.002169	.000372	.926504	.029832	-.009544	.97078	1.02742
11.330	1.62704	.256180	-.002046	.000395	.935572	.026876	-.008929	.97520	1.02472
11.650	1.70892	.255545	-.001917	.000410	.943726	.024117	-.008313	.97904	1.02218
11.970	1.79059	.254953	-.001785	.000417	.951028	.021555	-.007702	.98235	1.01981
12.290	1.87209	.254403	-.001651	.000417	.957542	.019187	-.007101	.98521	1.01761
12.610	1.95342	.253896	-.001518	.000412	.963328	.017009	-.006515	.98765	1.01558
12.930	2.03459	.253431	-.001388	.000402	.968447	.015015	-.005948	.98974	1.01372
13.250	2.11562	.253007	-.001261	.000389	.972957	.013199	-.005404	.99150	1.01203
13.570	2.19652	.252624	-.001139	.000372	.976913	.011554	-.004885	.99300	1.01049
13.890	2.27730	.252278	-.001023	.000352	.980368	.010070	-.004394	.99425	1.00911
14.210	2.35798	.251968	-.000914	.000331	.983374	.008738	-.003933	.99530	1.00787
14.850	2.51906	.251447	-.000717	.000285	.988219	.006494	-.003103	.99690	1.00579
15.490	2.67986	.251044	-.000550	.000238	.991790	.004740	-.002399	.99799	1.00418
16.130	2.84042	.250738	-.000412	.000193	.994374	.003398	-.001817	.99872	1.00295
16.770	3.00082	.250511	-.000302	.000152	.996210	.002391	-.001348	.99919	1.00204
17.410	3.16109	.250346	-.000217	.000116	.997492	.001652	-.000979	.99950	1.00138
18.050	3.32127	.250229	-.000152	.000087	.998369	.001120	-.000697	.99969	1.00092
18.690	3.48139	.250148	-.000104	.000063	.998959	.000745	-.000486	.99981	1.00059
19.330	3.64146	.250093	-.000070	.000045	.999348	.000486	-.000331	.99988	1.00037
19.970	3.80151	.250056	-.000046	.000031	.999600	.000311	-.000221	.99992	1.00022
20.610	3.96154	.250032	-.000030	.000021	.999760	.000196	-.000145	.99995	1.00013
21.250	4.12155	.250017	-.000019	.000014	.999860	.000121	-.000093	.99996	1.00007
21.890	4.28156	.250007	-.000012	.000009	.999921	.000073	-.000058	.99997	1.00003
22.530	4.44156	.250001	-.000007	.000006	.999957	.000043	-.000036	.99997	1.00000
23.170	4.60156	.249997	-.000004	.000003	.999978	.000025	-.000022	.99997	.99999
23.810	4.76156	.249995	-.000003	.000002	.999991	.000014	-.000013	.99997	.99998
24.450	4.92156	.249994	-.000002	.000001	.999998	.000008	-.000007	.99997	.99997

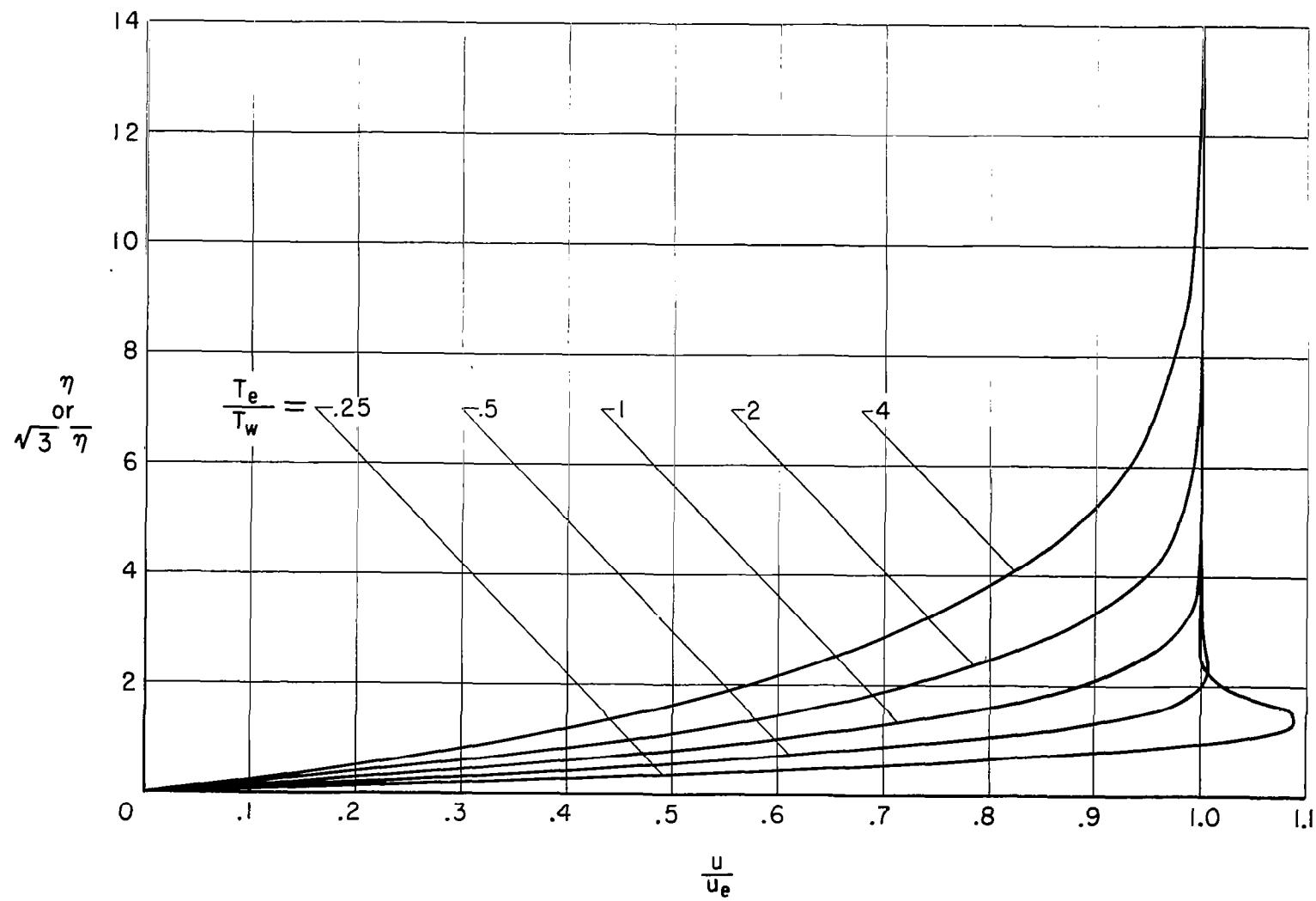


Figure 1.- Velocity profiles for  $f_w = 0.$

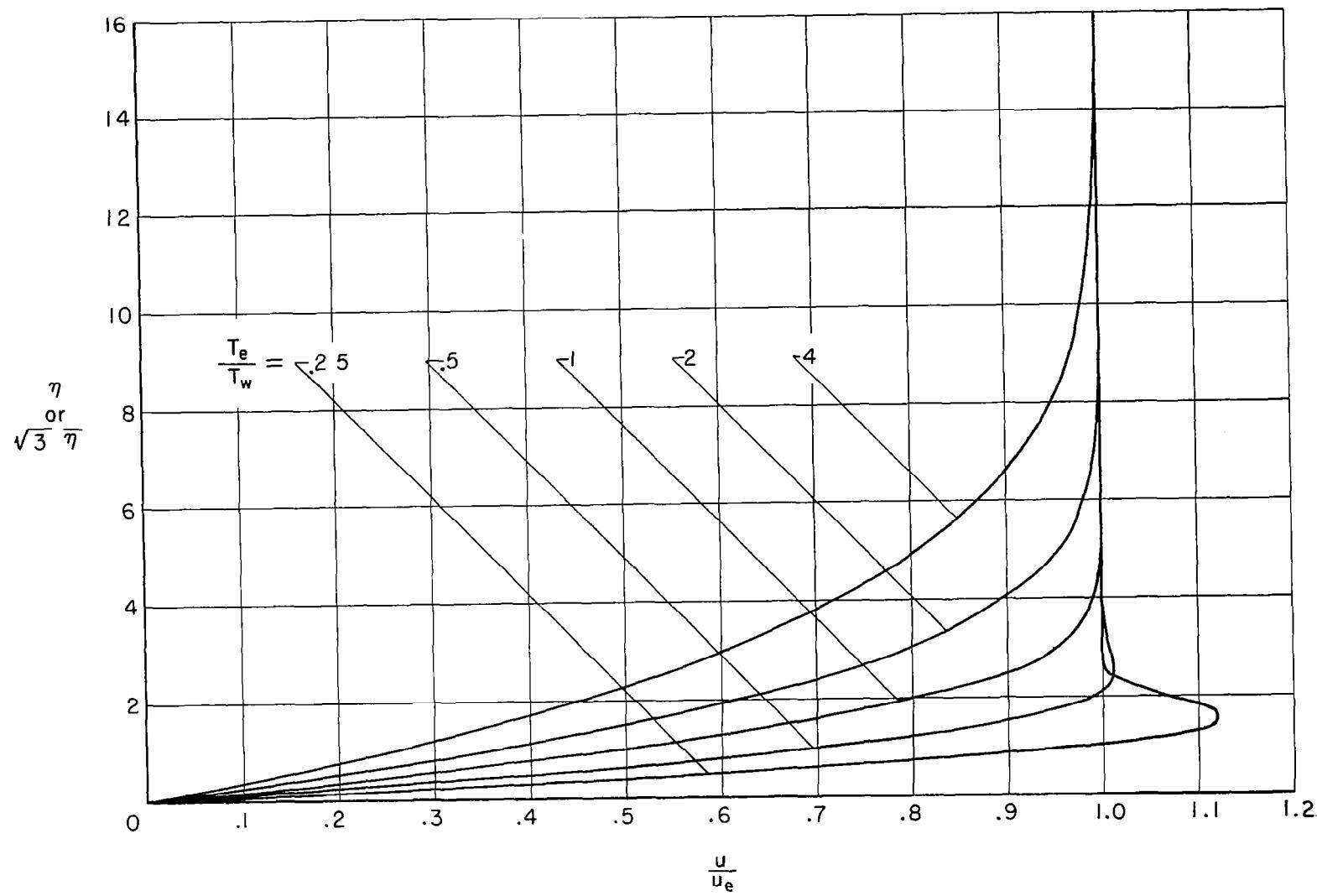


Figure 2.- Velocity profiles for  $f_w = -0.5$

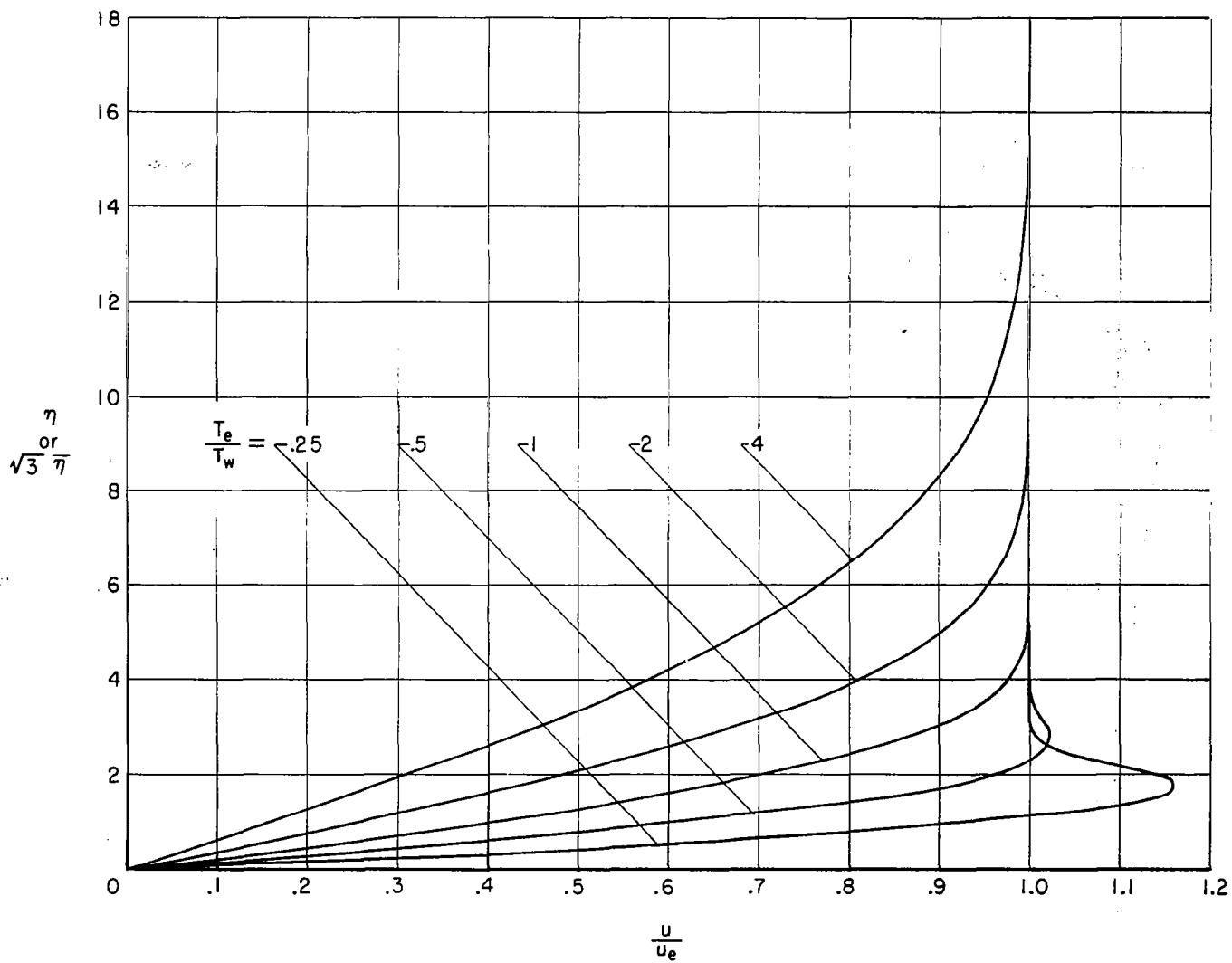


Figure 3.- Velocity profiles for  $f_w = -1.0.$

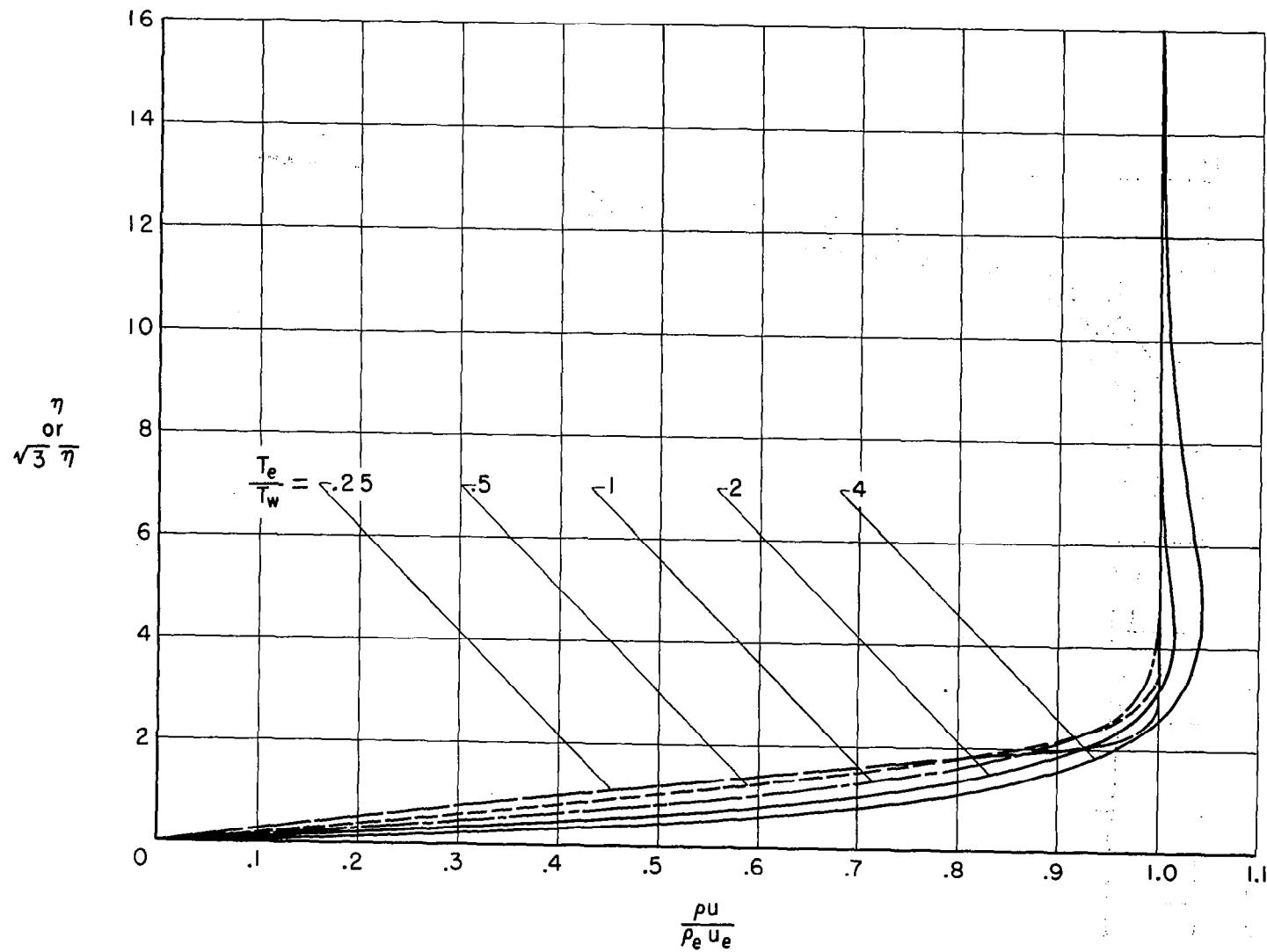


Figure 4.- Mass-flow profiles for  $f_w = 0.$

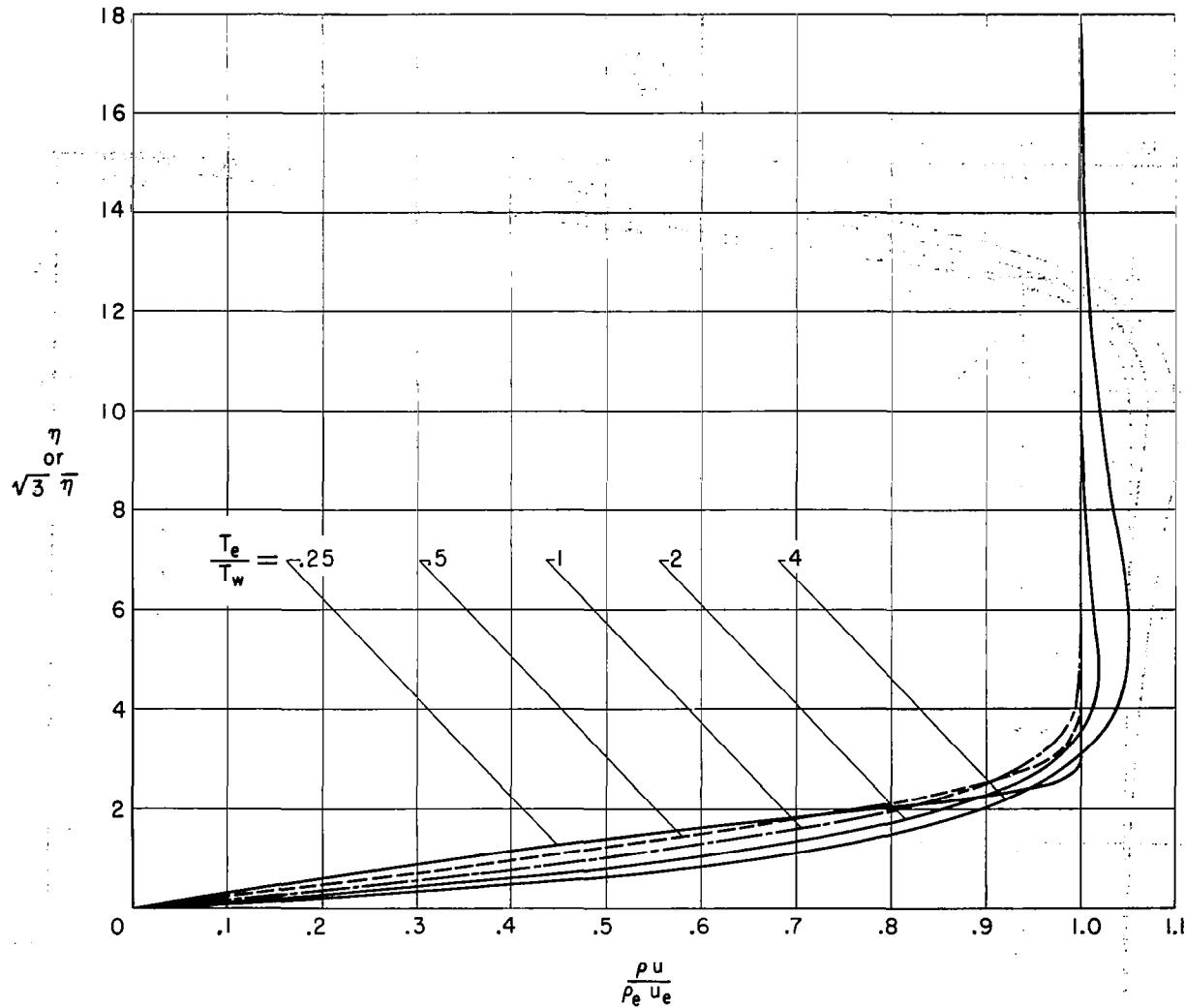


Figure 5.- Mass-flow profiles for  $f_w = -0.5$ .

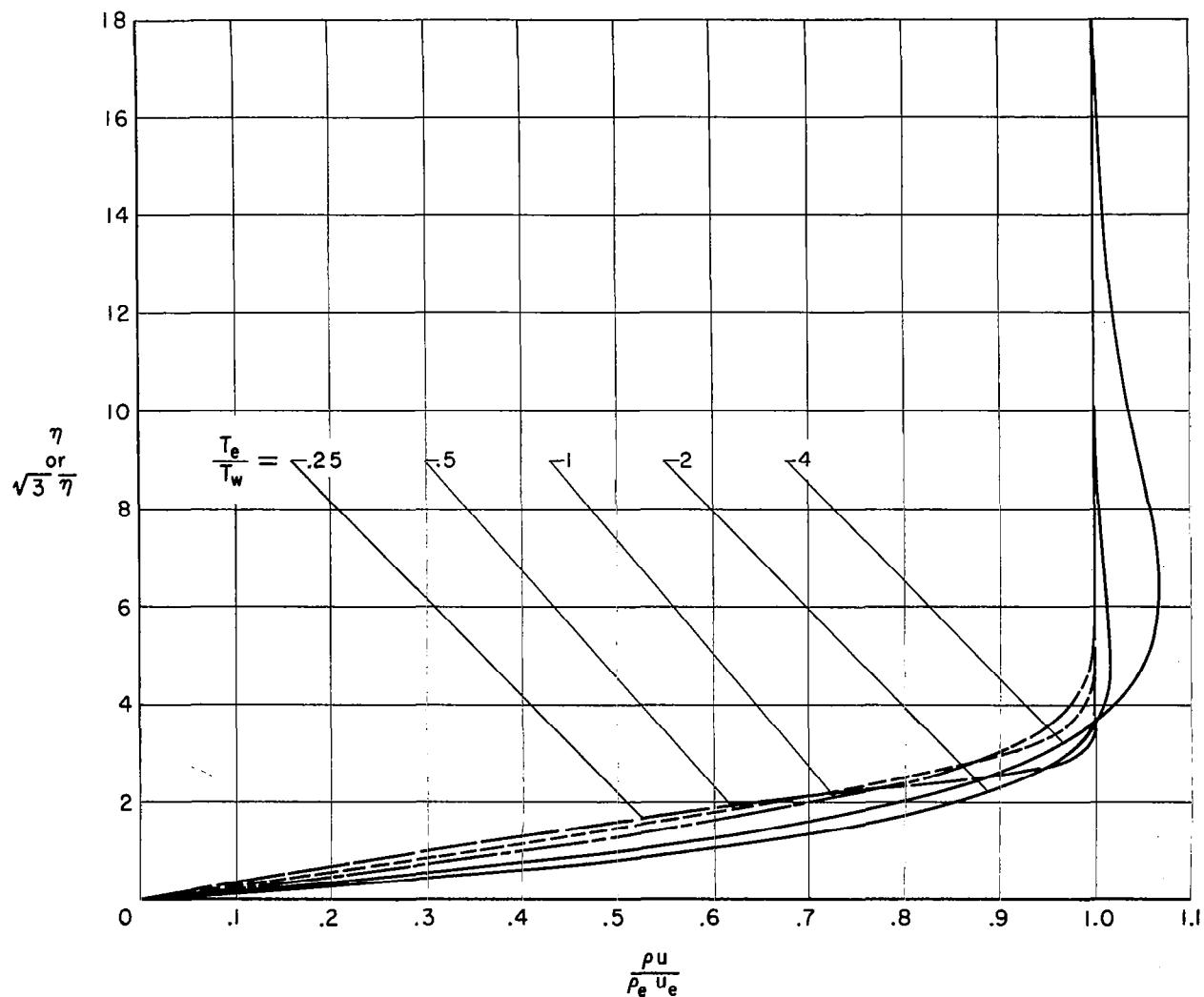


Figure 6.- Mass-flow profiles for  $f_w = -1.0.$

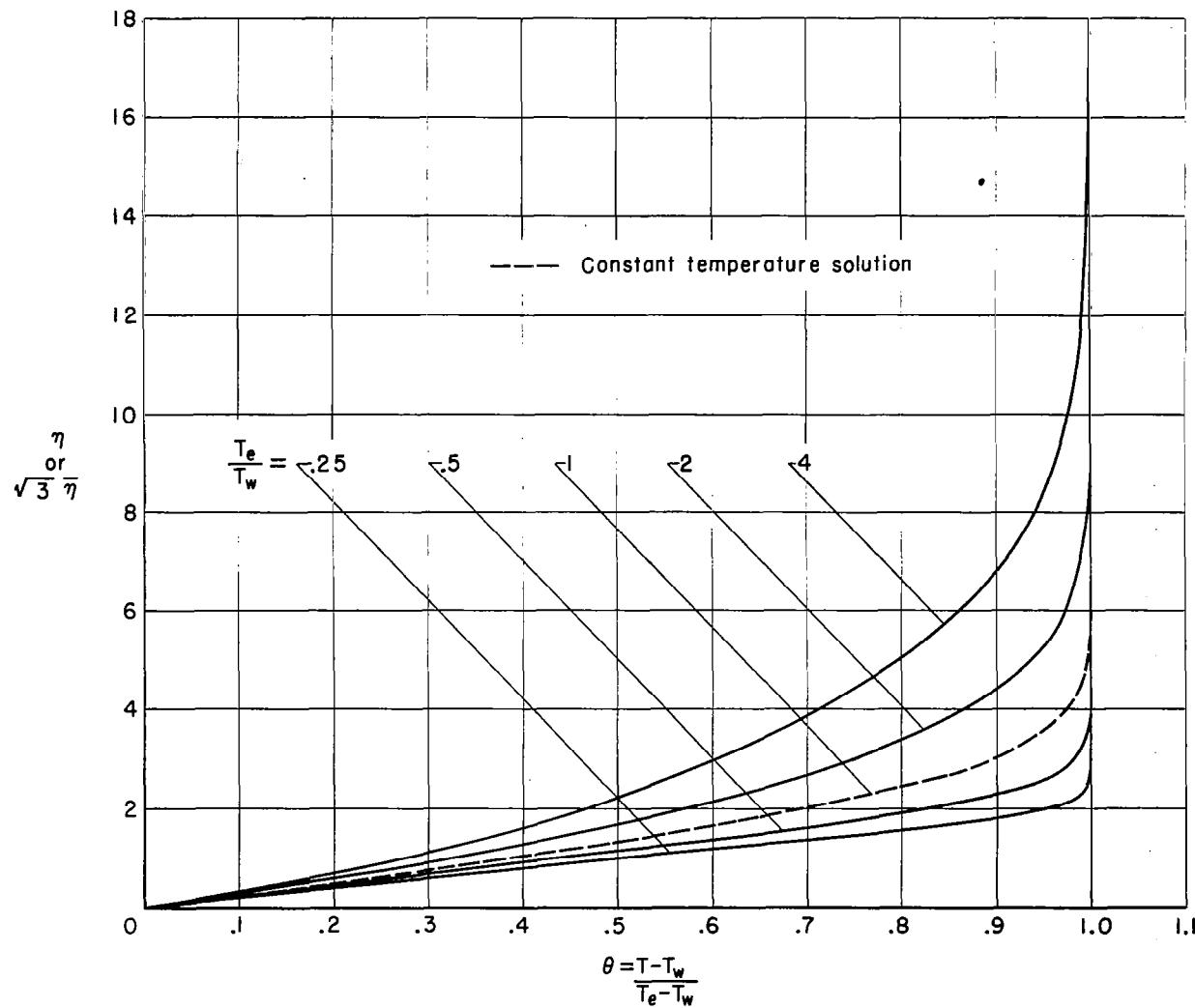


Figure 7.- Temperature profiles for  $f_w = 0.$

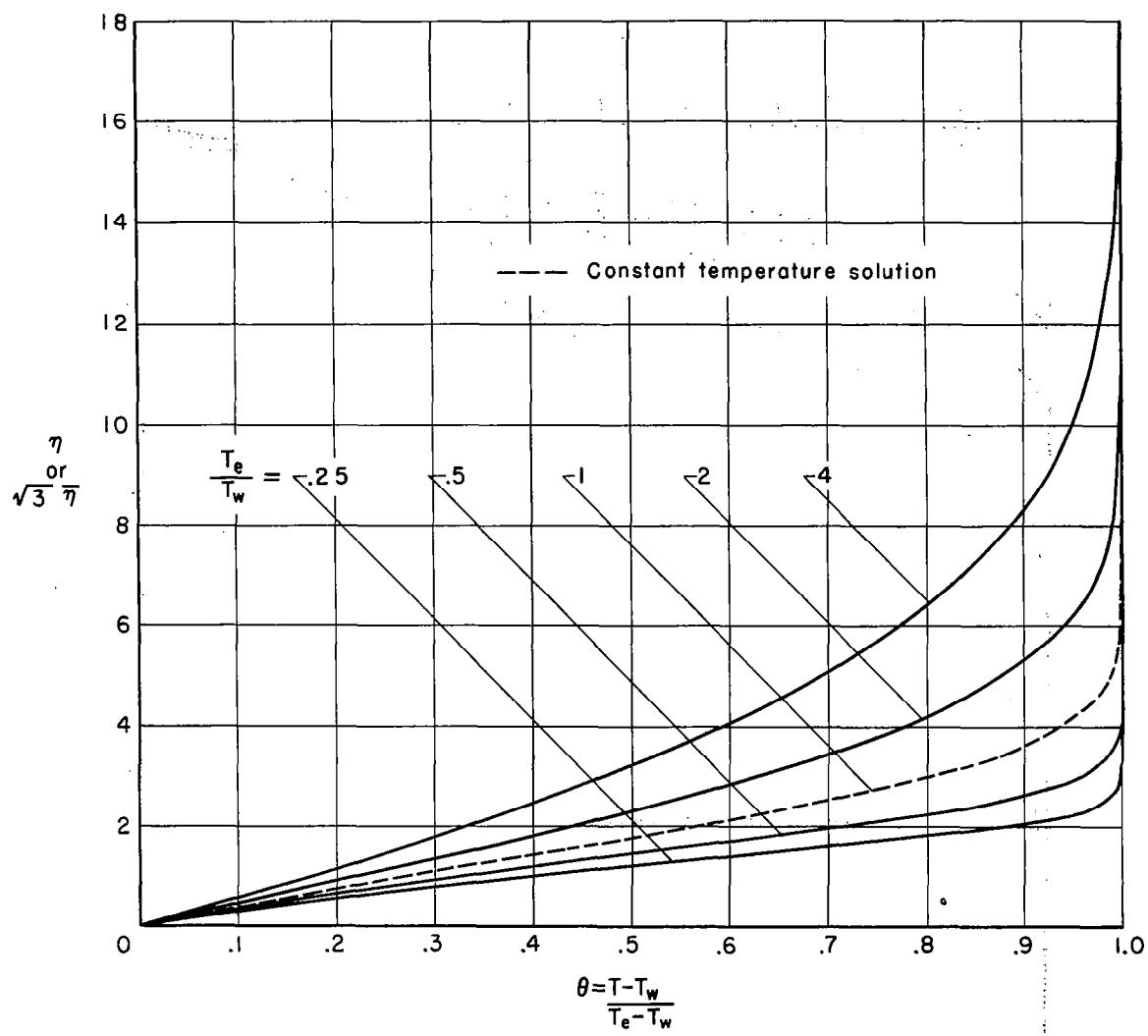


Figure 8.- Temperature profiles for  $f_w = -0.5$ .

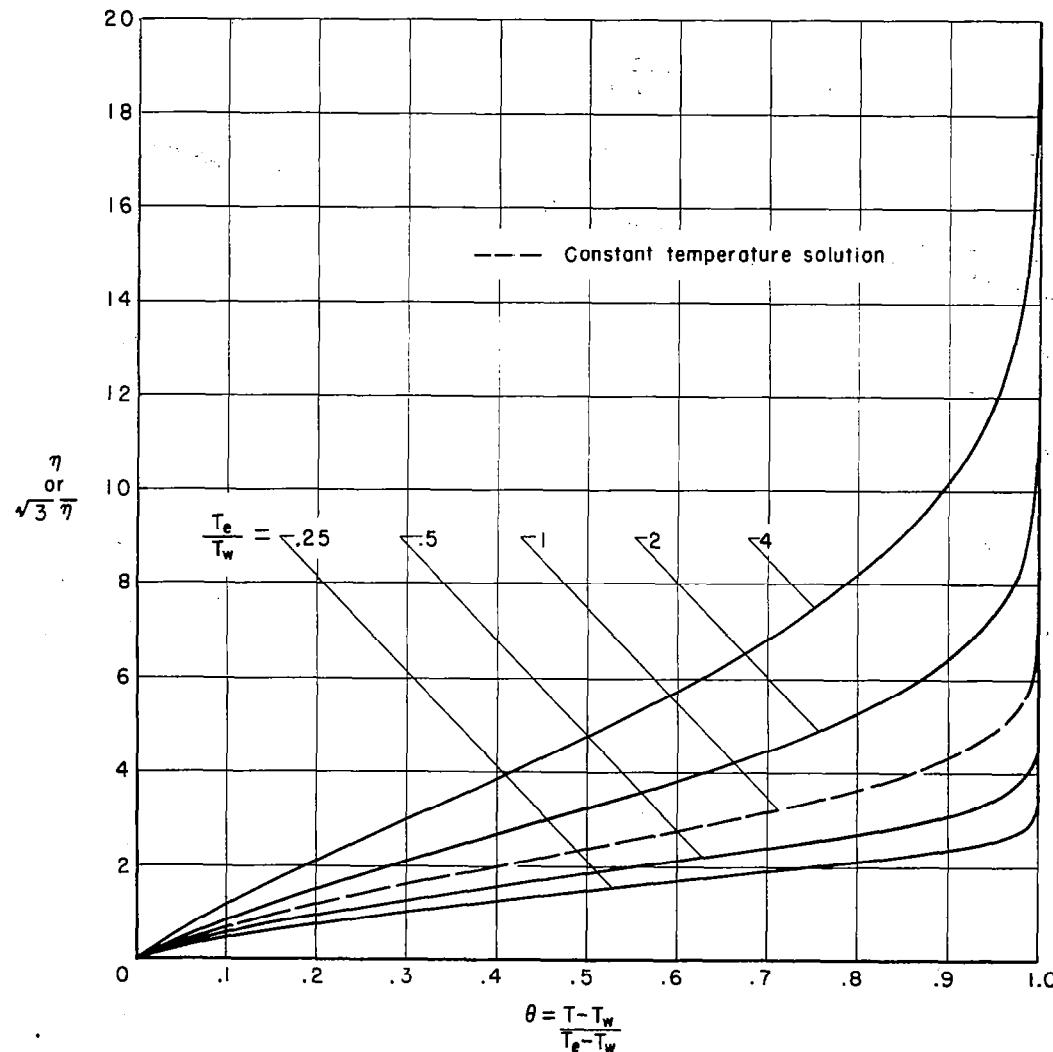


Figure 9.- Temperature profiles for  $f_w = -1.0$ .

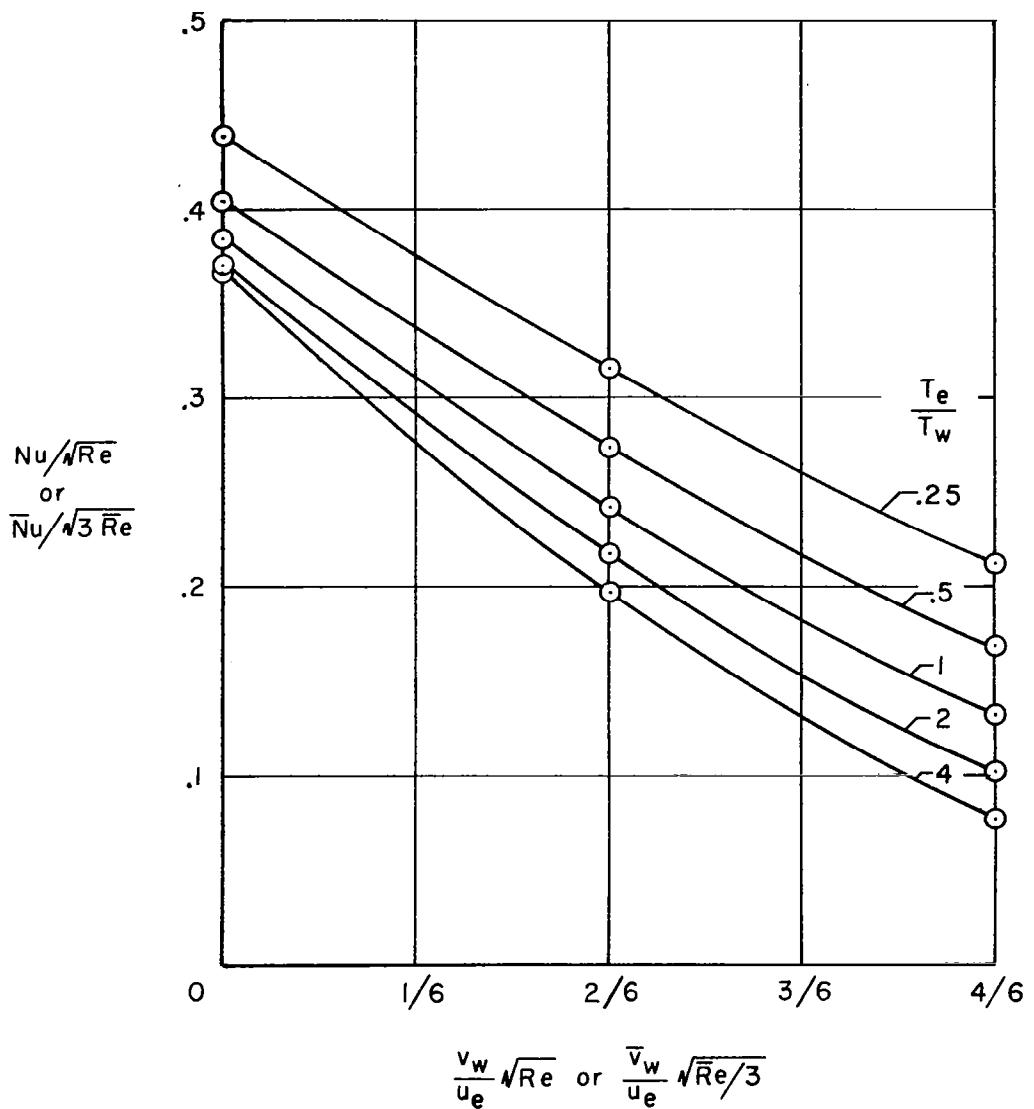


Figure 10.- The influence of transpiration and wall temperature level on the heat-transfer parameter.

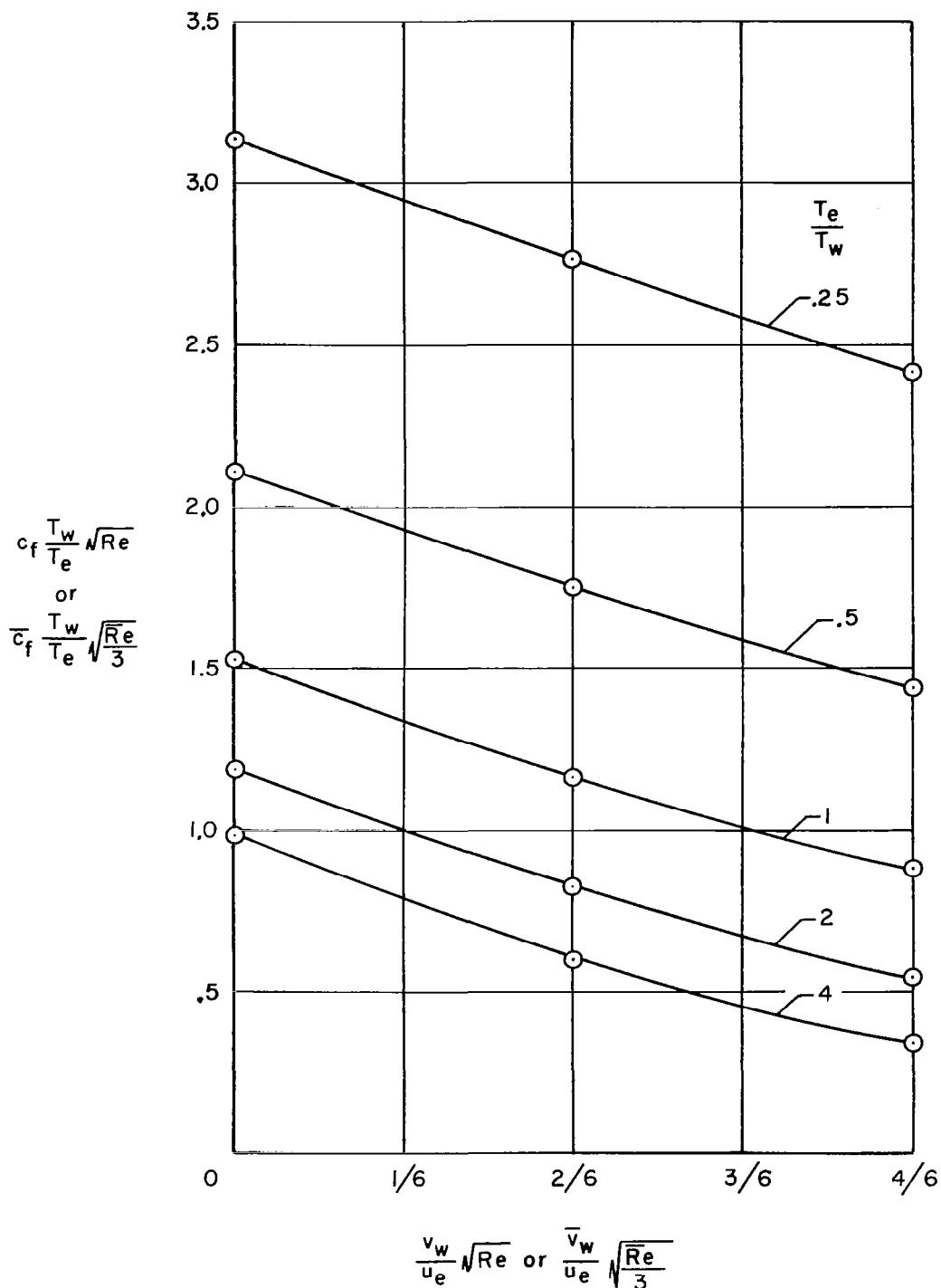


Figure 11.- The influence of transpiration and wall temperature level on the skin-friction parameter.